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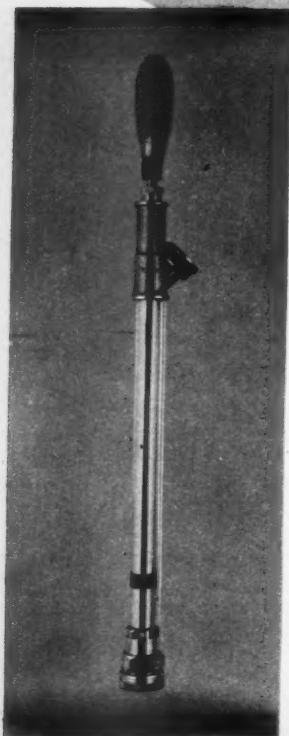


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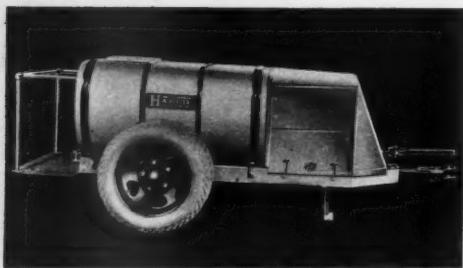
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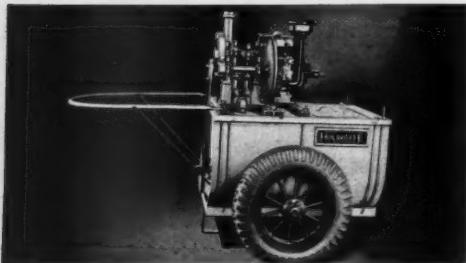
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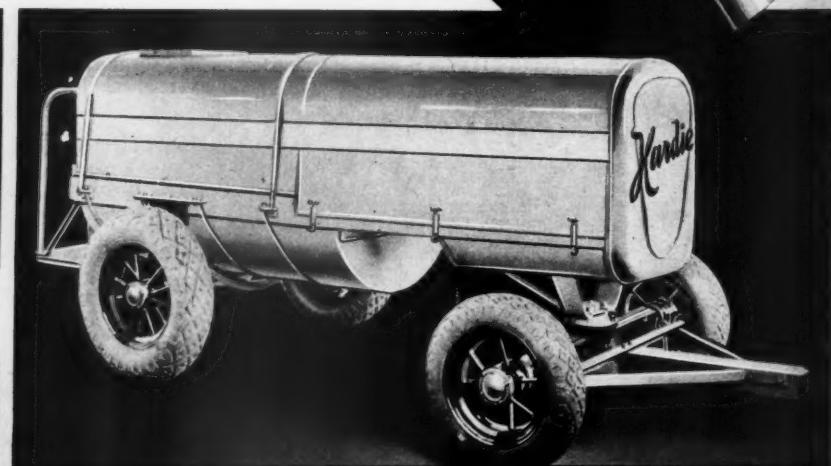
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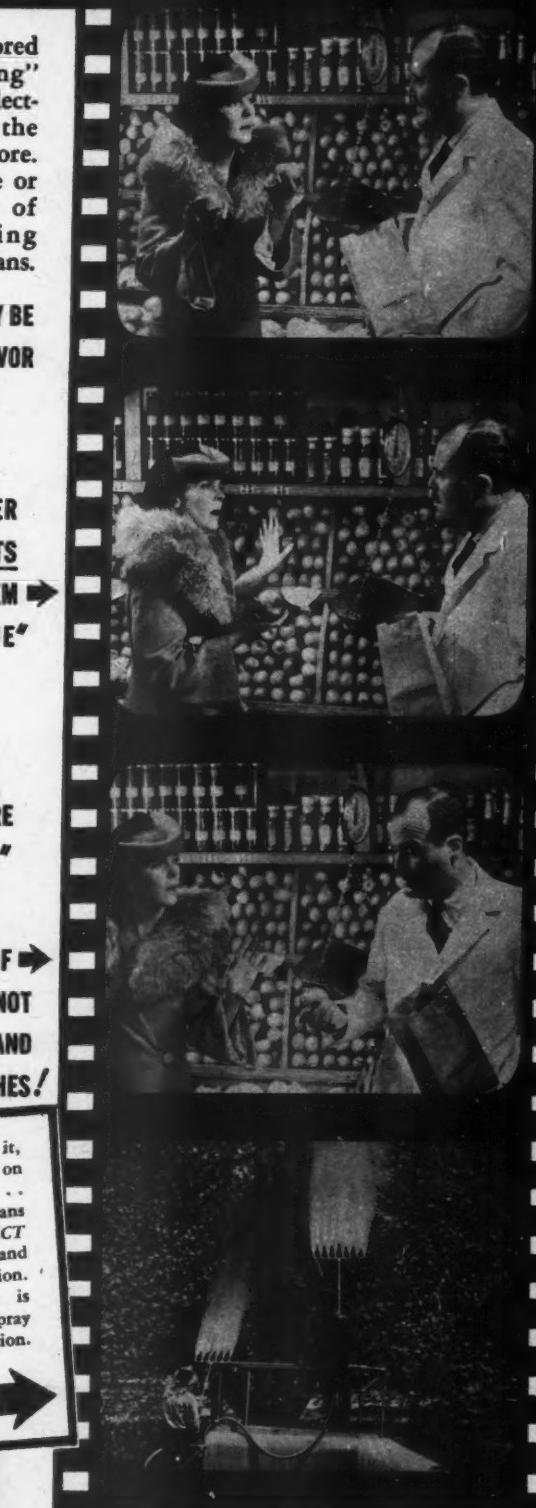
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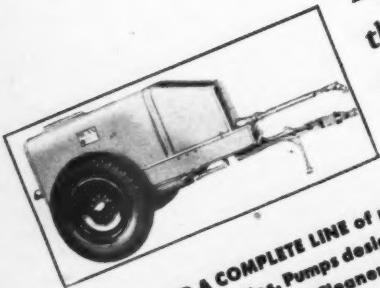
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AMERICAN FRUIT GROWER

The
NATIONAL FRUIT MAGAZINE

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[Editorial]

PEAKS OF PROGRESS IN SPRAYING

IT IS generally accepted that spraying is the most important, or at least the most telling single practice of the orchard. Blemished fruit has no place on the market and is not wanted by the canner or the maker of good cider. It is a constant warfare to control insects and diseases and the grower has no option but to take the offensive.

One sometimes wonders whether there has been any progress or whether we go in circles. The population of worms and the prevalence of disease convinces us that it is an annual problem, or as the fairy tale puts it, "We must run as fast as we can to stay where we are." If we are to take inventory of our progress, we must look at more than one or two years. Let us scan the past five or 10 years, at least, to obtain a measure of the new discoveries and the accomplishments.

First, looking at insecticides, we see several changes in materials and equipment which bode no good for the bugs. It depends on your point of view and your location as to which innovations you would rank at the top. Even a glance through the advertisements will reveal new products, new equipment, new formulas, greater attention to finish of fruit and condition of foliage.

Take, for instance, the old aphid problem. Anyone who has lived through a serious infestation of rosy aphid knows how futile it is to combat this pest after the leaves have curled. During the past few years, the tar oils have become a specific for aphid eggs and for scale, particularly in New York and Pennsylvania. This was a valuable contribution. Now two new organic contact insecticides, di-nitro-ortho-cyclo-phenol and ortho-dinitro-cresol, are being widely used for aphid, red mite and scale. These sprays represent a new "high" in the fight against orchard insects.

In Ohio, Indiana and Illinois, particularly, the apple flea weevil grew increasingly destructive for a number of years. The only relief seemed to be thorough cultivation. Not a vestige of vegetation was to be left in the orchard, and even that treatment was far from satisfactory. Then came the fluorine sprays or natural and synthetic cryolites. These sprays were one of the most complete successes of the past 10 years. A single treatment in a badly infested orchard annihilated the insect, much to the credit of the entomologist. It was the death knell to an insidious pest. Cryolite has also loomed as a prominent substitute for arsenate of lead against the codling moth.

Codling moth has long held the center of the stage so far as apple insects are concerned, and arsenate of lead still dominates the field as a control measure. But the past few years have seen some striking developments in the use of summer oil emulsions and certain nicotine combinations, particularly "tank mix", which is a combination of nicotine with bentonite. Fixed nicotine has also assumed importance. No more striking demonstration came to the attention of AMERICAN FRUIT GROWER during the past summer than control with this tank mixture and it should greatly encourage those who have suffered so extensively and almost hopelessly from this insect. Cryolite, as mentioned above, is another important new codling moth spray. That it costs about twice as much as lead arsenate is still the fly in the ointment. Codling moth never seems to be licked and each year, as Dr. C. R. Cutright has remarked, it is a new season for the bug as well as for the grower.

In the field of fungicides, there have also been changes and improvements. Beginning nearly two decades ago came the work in the dilution of both Bordeaux mixture and lime-sulphur sprays. This change was prompted by the widespread injury to fruit and foliage which had come to be accepted as a necessary part of spraying. Our attention was first called to the injury of strong lime-sulphur sprays in the Annapolis Valley of Nova Scotia as early as 1912 and 1913. It was observed that the set of fruit was reduced measurably by its use and Bordeaux mixture was recommended as a substitute.

The earlier work on the dilution of sprays has been followed by the introduction of less caustic materials such as the so-called wettable sulphurs. Their adhesiveness and effectiveness in the cover sprays for apple scab, as well as in the pre-blossom sprays in some areas, is winning for them an important place.

After all, the time-honored injunctions of timeliness and thoroughness are as valid today as ever before. Whatever may come in the direction of superior equipment or better and safer materials, the personal element will always be paramount. Unless there be a trained and responsible man at one end of the spray gun who realizes that there will be fruit on the tree in autumn, no spray formula will ever solve the problem.

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Above: A young orchard getting the right start, with the Farmall-A and spring-tooth harrow keeping the ground in good shape. Right: Here's a solution to the orchard-to-packing-house hauling problem. This Farmall-A and trailer combination is handy, speedy, economical.

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of direct-attachable machines.

Look over the Farmall-A at the nearby International Harvester dealer's store. We especially recommend it for orchardists who also grow small acreages of row crops. You'll find that this 1-plow, 1-row tractor is a great value.

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EARLY SPRING SPRAYS

By F. Z. HARTZELL

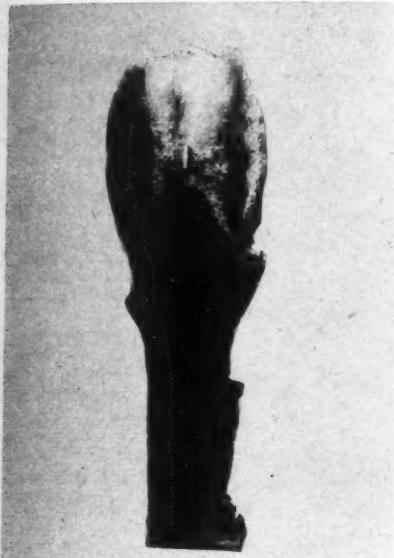
New York Agricultural Experiment Station

INTEREST in early spring sprays has greatly increased during the past decade, chiefly because new materials have been made available. Experiments have shown that with the arsenal at the growers' command, a larger number of insects can now be controlled at this season than has been possible heretofore. Furthermore, certain pests can be combated more effectively or more economically by these prefoliage sprays than by later treatments. Another reason for this interest is because the grower, by varying his mixtures, has a

longer period in which to spray for certain pests than was possible a few years ago. The fact that usually several species can be controlled by a single application makes economy an additional feature of these treatments.

It must not be forgotten that early season spraying meets with certain obstacles. March, April and early May are apt to have numerous wet, stormy periods when sprays cannot be applied because of mud, rain or high wind. Freezing temperatures are apt to occur suddenly, so spray

Apple bud development is guide to spring spraying. Below is stage just before late delayed dormant. Other stages, lower left.



Above—Breaking-Bud

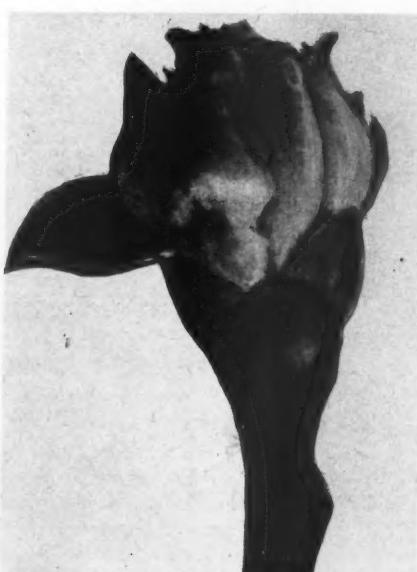


Above—Early Delayed Dormant

Below—Late Delayed Dormant



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AMERICAN FRUIT GROWER

equipment must be drained at the end of each day's work or sheltered to avoid broken parts due to freezing.

It is very important that the reader have a clear understanding what is meant by the several bud stages. The New York definitions are given: *Dormant* means the period in the late winter and early spring when the fruit buds, although swollen, have not separated at the tips sufficiently for liquids to reach the green tissue. *Breaking-bud* is the stage when there is a slight opening at the tip sufficient to enable the observer to see green tissue deep in the bud. The stage is considered ended when the green tip can first be seen at the end of the bud. *Green-tip* is the period when the tips of the buds show green and before the young leaves have separated from the buds. In some states this stage is called the delayed dormant, so do not confuse terms. *Delayed dormant* is the stage when the young leaves are from one-eighth to one-half inch in length.

In planning for the season's spray program, probably the most difficult feature is the uncertainty in length of bud stages. For example, the average length of time for each of these periods in western New York is as follows: *Dormant*, one month; *breaking-bud*, four days; *green-tip*, five days; and *delayed dormant*, four days. In 1939 they were altered in the following manner: *Dormant*, two weeks; *breaking-bud*, one week; *green-tip*, one week, and *delayed dormant*, four days. Excessively wet ground, wind and rain reduced the dormant period to practically one week of spraying. To control oyster-

(Continued on page 38)

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Closely coupled with use of adequate equipment for pest control work is matter of proper chemicals that result in death to insects and diseases but do not cause tree and foliage injury.

RESULTS WITH NICOTINE-BENTONITE FOR CODLING MOTH CONTROL

By FRANK T. STREET

JUST south of the southern Indiana fruit belt, the Kentucky Cardinal Farms near Henderson, Ky., are operating some 3600 acres of farm lands lying along the southern bank of the Ohio River. About 400 acres of this land is operated as a commercial orchard, consisting of apples, peaches, cherries and other fruits. There are approximately 200 acres of apples in this planting, ranging in age from 20 to 30 years, with the bulk of the acreage consisting of Winesap, Stayman and Red and Golden Delicious.

Located on the southern border of the commercial apple belt, control of codling moth with the usual arsenate of lead program has been impossible; also the dynamite-lead programs have been ineffective, even where schedules were used that made the cleaning of the fruit to tolerance requirements nearly impossible. With such a dynamite-lead schedule in 1938, we had a crop of apples showing more than 50 per cent live worms and near 100 per cent stung fruit.

In 1939 we put 125 acres of this planting under the tank-mix nicotine-bentonite schedule worked out by L. F. Steiner, R. F. Sazama and J. E. Fehey of the U. S. Bureau of Entomology at the Vincennes, Ind., laboratory. The spray schedule used is given on this page.

The entire acreage was sprayed from central stationary outfits, using relatively hard water, with excellent agitation and high pressure. The year 1939 was one of extremes in our section. The rainfall was excessive early in the season and very deficient later, as will be noted from the following figures:

Rainfall April through September

Date	Inches
April	7.30
May	2.85
June	4.17
July	3.35
August	2.87
September	.73

We soon found that the color contrast between the wet and dry foliage sprayed with the nicotine-bentonite enabled the spraymen to cover the trees with less material than when using the lead program. Consequently, the nicotine blocks were covered with an average of 13 gallons per tree as contrasted with 18 gallons on the lead areas. This was a material factor in reducing the higher cost per tree of the nicotine program. Another important factor was the almost complete

control of leaf hopper in the nicotine blocks, which undoubtedly was a factor in this fruit showing much better color than that from the lead blocks.

Another important consideration was that by this schedule we were able to eliminate the washing of all the yellow and late red varieties. By running them over a good brushing outfit to which a small quantity of mineral oil was added to the brushes as needed, these apples went into the package with fine finish. In the burning hot, dry September in which most of this fruit was harvested, this was a most important factor as it permitted us to rush the fruit from the orchard directly into our storage. The brushing and packing operation could then be done as the fruit was sold during the fall and early winter months.

Most important of all considerations was worm control. With the schedule given we came through the season with better than 90 per cent worm-free fruit and very few stings. In our lead blocks, on the other hand, we lost fully 50 per cent of the apples from worm entrances and had nine times as many stings on the fruit.

Having noted these results, we will most certainly be using this nicotine program another year. It will be necessary, however, to make some modifications which have not yet been worked out. By leaving out the buffer in the first cover spray in the nicotine schedule (lead and soybean flour), lead injury to the foliage on the nicotine blocks started showing up in July and was rather severe in August and September on certain varieties. Then bitter rot and sooty blotch will have to be considered in the 1940 program as the nicotine schedule gave us no

(Continued on page 31)

SPRAY SCHEDULE USED IN KENTUCKY CARDINAL ORCHARDS—1939

Application	Dates	Nicotine Program		Dates	Lead Arsenate Program	
		Material	Material		Material	Material
Calyx	Apr. 27	3 lbs. lead; 3 lbs. lime; 6 lbs. wet-table sulphur through all blocks		Apr. 27	3 lbs. lead; 3 lbs. lime; 6 lbs. wet-table sulphur through all blocks	
Calyx top-off	May 1	3 lbs. lead; 3 lbs. lime; 4 lbs. wet-table sulphur		May 1	3 lbs. lead; 3 lbs. lime; 4 lbs. wet-table sulphur	
First cover	May 15	4 lbs. lead; $\frac{1}{4}$ lb. soybean flour		May 15	4 lbs. lead; 4 lbs. lime; $\frac{1}{4}$ lb. soybean flour	
Second cover	May 22	1 pt. nicotine; 5 lbs. bentonite; 1 qt. soybean oil		May 22	4 lbs. lead; 2 qts. summer oil in $\frac{3}{4}$ -1½-100 Bordeaux	
Third cover	May 29	1 pt. nicotine; 5 lbs. bentonite; 1 qt. soybean oil		May 29	4 lbs. lead; 2 qts. summer oil in $\frac{3}{4}$ -1½-100 Bordeaux	
Fourth cover	June 12	1 pt. nicotine; 5 lbs. bentonite; 1 qt. soybean oil		June 12	4 lbs. lead; 2 qts. summer oil in $\frac{3}{4}$ -1½-100 Bordeaux	
First cover, second brood	July 5	1 pt. nicotine; 5 lbs. bentonite; 1 qt. soybean oil		July 5	3 lbs. lead; 2 qts. summer oil in $\frac{3}{4}$ -1½-100 Bordeaux	
Second cover, second brood	July 17	1 pt. nicotine; 5 lbs. bentonite; 1 qt. soybean oil		July 17	No lead spray applied	



ONE of the most pronounced characteristics of the age in which we live is the rapidity of the tempo of human life. Profound changes in every field of man's interest and activity seem continually to develop in bewildering succession.

In no realm of human endeavor is this more true than in that of insect control practice. We used to speak of certain methods as "standard," meaning thereby that a given method was generally accepted to be superior to all others in point of effectiveness and practicability.

Today, it seems hardly safe to call any specific method "standard," so rapidly may new and better materials and ways of using them supplant the older and longer established measures.

This situation is particularly true of codling moth control practices as they have developed during the past decade.

Ten years ago, and at even later dates, codling moth control investigators, testing some new experimental modification or practice, checked the results secured against a "standard" treatment, which, with at most only slight modifications, was generally accepted the country over as most satisfactory. This "standard" method was the use of a relatively simple spray mixture of arsenate of lead.

Today, one hesitates to speak of any simple arsenate of lead spray or schedule as the "standard." Rather, so far at least as codling moth control practice in the chief fruit growing sections of the Midwest is concerned, there might be said to be at least three "standard" general methods of control that have developed from the extensive experimental investigation of new modifications and materials and of ways of using them. These are:

1. Arsenate of lead.
2. Arsenate of lead plus summer oil.
3. Nicotine sprays.

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Each of these three general or type methods are in turn subject to various modifications.

Disregarding all these possible modifications in materials and schedules, there would seem at present to be about five quite well-defined specific treatments used commercially for codling moth control in Midwest orchards to a sufficient degree to be considered as typically representative. These are:

1. Full season use of arsenate of lead usually with safeners or deposit-builders or both. This treatment requires washing.

2. Arsenate of lead plus summer oil. This method also requires washing.

3. Factory-processed (proprietary) fixed nicotine plus summer oil in a major part of the schedule—a non-wash program.

4. Tank - mix nicotine - bentonite spray in a major part of the schedule—a non-wash program so far as lead and arsenic residue removal is concerned.

5. Summer oil containing oil-soluble nicotine plus conditioning agent in a major portion of the schedule—a non-wash program.

While each of the above methods had been tested and tried for several seasons prior to 1939 in sufficient degree to indicate control reliability, and test comparisons between two or more of the methods had been made in individual cases, it appeared that there was no record of all five treatments having been tested in comparison with each other in a given season in the same orchard.

It was felt that such comparison
(Continued on page 24)

A 1939 TEST COMPARISON OF FIVE TYPICAL TREATMENTS FOR CODLING MOTH CONTROL

By C. R. CLEVELAND



These trees (upper left) that were sprayed with summer oil containing oil-soluble nicotine showed little or no defoliation and good leaf color resulting from absence of spray injury and control of red spider, while trees (above) to which the arsenate of lead-soybean flour mixture was applied had poor leaf color and lost foliage in midseason because of combined spray injury and red spider attack.



Growers in the vicinity of the test plots were keen to observe control effects and symptoms of spray injury. At right is inspection group.

AMERICAN FRUIT GROWER

PAGE II

SCRAPING and BANDING APPLE TREES FOR CODLING MOTH CONTROL

By M. A. YOTHERS

U.S. Department of Agriculture

Bureau of Entomology and Plant Quarantine



Rough bark like that shown above on Jonathan tree provides an ideal overwintering place for pupae of codling moth. After a restful wait under the bark scales, the adults emerge in the spring and set out on their ruinous cycle of pesky worm production.

To do away with winter haunts of the codling moth, many a grower in past years has turned to tree scraping, like the orchardist is doing at left. That such a practice is result-producing is pointed out in article describing operation in Washington orchards.

Scraped free of loose, scaly bark, both on the trunk and lower scaffold branches, the Jonathan tree pictured below has been rid of all likely codling moth overwintering spots and is in proper condition for supplemental banding.

DURING the last five years the Yakima, Wash., laboratory of the Bureau of Entomology and Plant Quarantine has been conducting experiments upon the possible value of orchard sanitation (scrapping and banding of apple trees) as a supplementary control measure for the codling moth. The method of conducting these experiments has been as follows: A 10-acre block of a 20-acre well-infested orchard was thoroughly scraped before moth emergence in the spring and then banded in June with beta-naphthol-oil-treated bands applied to the trunks. The other half, the check, was neither scraped nor banded, but was sprayed the same as the scraped and banded block (with one exception, mentioned later). The method of checking on the results was to examine the dropped and harvested fruit from a considerable number of

trees of each variety in both the sanitation and the check blocks, making a comparison of the percentages of wormy, stung and clean apples.

The whole tree was gone over in the scraping, including three to four inches in the soil at the base. Scrapings were caught and burned to destroy larvae and pupae not critically injured or killed by the scraping process, and to prevent the accumulation of scrapings as additional orchard debris.

These experiments have run for five years in one orchard, three in another, two in a third, and one in the fourth. The results of these tests, as shown in Table 1, indicate but one conclusion: in all orchards, in all varieties, and for all years, the scraping and banding program has given a greater degree of freedom from codling moth infesta-

(Continued on page 36)

AMERICAN FRUIT GROWER



SPRAYTIME CLOTHING for 1940



EVEN the man-behind-the-gun doesn't like to get wet while spraying. Often, by spraying from a "safe" distance, instead of getting into the tree he fails to achieve complete coverage. Properly clothed, however, the sprayman can do a better, safer and less wasteful job.

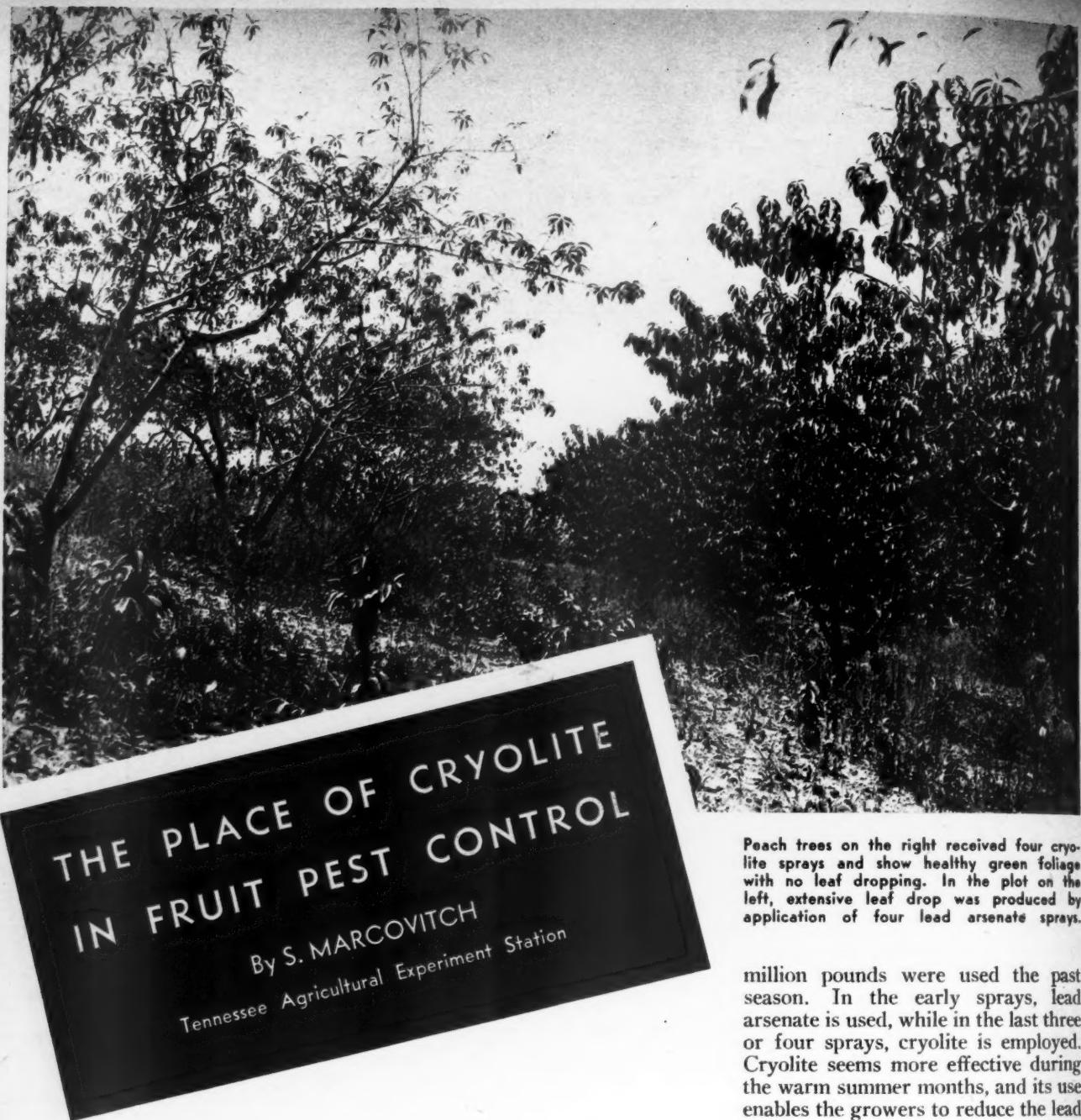
A 1940 sprayman is shown above. His regular garments are protected by rubber trousers and jacket. Face and head are kept free of chemicals by face shield and rubber hat, while rubber gloves protect hands and arctics cover his feet. His clothing is made by United States Rubber Company and face protector by Chicago Eye Shield Company.

Ventilated rubber coat by United States Rubber Company, with hat and boots by the same firm, features the spraytime attire of the pest-controller above, left. His eyes are protected against possible backwash from the spray broom by Cover self-cleaning goggles.

The oilskin suit at left is a new item for fruit farm wear. Hat and suit are made by A. J. Tower Company and arctics are from United States Rubber Company. This sprayman carries out the protection features of a complete outfit by wearing one of the Chicago Eye Shield E-Z C face protectors.

Besides the operators who man the spray guns or brooms, those who mix chemicals also face injury hazards. To avoid trouble, the workman at right is fitted with United States Rubber Company hat, Cover goggles and respirator and an acid-resisting apron and rubber gloves made by Miller Rubber Company.





THE PLACE OF CRYOLITE IN FRUIT PEST CONTROL

By S. MARCOVITCH

Tennessee Agricultural Experiment Station

Peach trees on the right received four cryolite sprays and show healthy green foliage with no leaf dropping. In the plot on the left, extensive leaf drop was produced by application of four lead arsenate sprays.

THE fluorine compounds have proved themselves to be the best available arsenical substitutes for the control of insects. Like the arsenicals, they are inorganics, stable in composition, available in commercial quantities and relatively economical in cost. Sodium fluosilicate, a by-product in the manufacture of acid phosphate, is finding extensive use in baits for grasshoppers and cutworms, while cryolite has made rapid strides as an insecticide for fruit pests such as the codling moth, plum curculio and apple flea weevil, and for vegetable insects such as flea beetles, the Mexican bean beetle and corn ear worm on tomatoes and beans.

Cryolite is a mineral mined in Greenland and is composed of sodium, aluminum and fluorine. Its principal use is in the manufacture of aluminum where more than 10,000 tons are used annually. The natural cryolite must simply be ground before it can be

used as an insecticide and occupies about 50 cubic inches to the pound. A synthetic form is now available which occupies 80 cubic inches to the pound and is composed of finely divided particles. Although both lead arsenate and cryolite are stomach poisons, their action varies with each specific insect, and it is the job of the entomologist to determine their relative merits as far as the control of each particular pest is concerned. They also differ in their effects on foliage, fruit and soil.

As to the codling moth, laboratory tests show that cryolite is a somewhat more effective killing agent than lead arsenate. The adhesive properties of cryolite are not as good as that of lead arsenate and for this reason cryolite is inferior to lead arsenate in the humid section. In regions of little rainfall, such as the Pacific Northwest, cryolite finds extensive use in a split spray schedule, where several

million pounds were used the past season. In the early sprays, lead arsenate is used, while in the last three or four sprays, cryolite is employed. Cryolite seems more effective during the warm summer months, and its use enables the growers to reduce the lead load.

There is no danger in poisoning the soil through the use of cryolite, since it is effectively neutralized by the calcium present in soils. Soil poisoning is assuming considerable importance in the sandy soils of South Carolina which became unfit for crops through the continual use of calcium arsenate in boll weevil control. The growers of the Pacific Northwest likewise are finding a poisoning of their soil from the extensive use of lead arsenate in the past.

A very remarkable property of cryolite is the fact that it is incapable of causing fatalities and is non-poisonous in the amount which might be present on apples. Before the nature of cryolite spray residues was understood, they were assumed to be poisonous and the growers had to comply with a tolerance of .01 of a grain of fluorine per pound of apples or 1.4 parts per million. In Arizona, it was found that when fluorine occurs

(Continued on page 22)

NEW CONTROL MEASURES FOR AMERICAN STRAWBERRY LEAF ROLLER

By RALPH L. PARKER

Kansas Agricultural Experiment Station

A SIX-YEAR study of the American strawberry leaf roller (*Ancylis comptana fragariae* Walsh and Riley) under drought conditions in northeastern Kansas, has shown that the strawberry fields are severely attacked by the first generation of this insect and that the first generation of larvae makes its appearance during the time the berries are growing and ripening. This insect is a limiting factor in strawberry production when rainfall is below normal.

The usual method of control in the past has been a lead arsenate spray applied before blooming. In the majority of cases, this spray has resulted in poor control of the insect. The primary object of the experimental work of the past six years has been to find a more suitable insecticide for the control of this pest and avoid the undesirable residue on the fruit at harvest time.

The eggs of the American strawberry leaf roller are laid on the undersides of the leaves and, under favorable temperature conditions, soon hatch. These young larvae spin thin webs for protection for a period of seven to 10 days. During this period the larvae do not fold the leaves. As the plant makes new growth, the larvae migrate to the newer and more succulent leaves. Almost immediately these leaves are rolled. In this way, more leaves are rolled and injured.

Since during the time the larvae of the first generation are growing, the strawberry plants make a 55 per



In above photo on left is three-fourths grown larva in leaflet which has been unrolled. Note webbing and skeletonization of leaf. Photos by F. J. Hanna and Ralph L. Parker.



cent growth increase in a 20-day period, a lead arsenate spray applied at the beginning of this period of leaf increase would not be effective during the middle or latter part of the time.

The control, which has been used with the one-crop system, is the application of 40 per cent nicotine sulphate at the rate of one-half pint plus one pint of summer oil emulsion to 50 gallons of spray mixture, with pressure enough to turn the leaves. This insecticide is applied three times at five-day intervals as soon as the first hatching larvae are noticed.

The three sprays so timed will successfully attack all of the larvae of this brood. The young larvae do not roll the leaves until after seven days in the larval stage. The insecticide combination is used to control the first generation of strawberry leaf roller

(Continued on page 43)

IN FOCUS

ON

PROFESSIONAL WORKERS WHO SERVE NATION'S FRUIT GROWERS

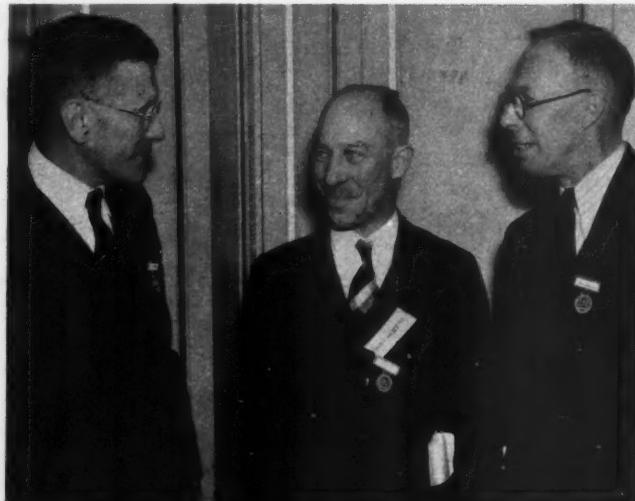


Being congratulated after election to presidency of American Society for Horticultural Science by (left to right) G. F. Potter, U. S. D. A., and Brooks Drain, Tennessee, is L. M. MacDaniels, Cornell University. The A. S. H. S. sessions were part of the American Association for the Advancement of Science meeting held at Columbus, Ohio, this year.



Top—With 1939 A. S. H. S. president V. R. Boswell, U. S. D. A. (second from right), are (left to right) Monroe McCown, Indiana, and U. S. D. A. workers F. P. Cullinan and E. M. Emmert. Above—M. A. Blake, New Jersey (left), and E. C. Auchter, U. S. D. A. Below—Small-fruit workers W. D. Armstrong, Kentucky; J. Harold Clarke, New Jersey; J. E. Veale, Arkansas, and A. S. Colby, Illinois.

Right—Entomologists (left to right) W. S. Hough, Virginia; D. M. DeLong, Ohio, and F. L. Thomas, Texas, were early arrivals at science meetings. Below—At Iowa meeting T. J. Maney talked on hardy stocks. Below, center—A part of the A. S. H. S. banquet entertainment program was stunt by past presidents. Here are J. K. Shaw, Massachusetts (left), and V. R. Gardner, Michigan, at xylophone. Below, right—From distant states came plant pathologists J. B. Carpenter, Wisconsin (left), and E. E. Wilson, California, to discuss fruit pest control problems at meeting.



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AN ADVENTURE WITH SPRAY MATERIALS

By JESSE C. CHILDS

Here's one grower's own story of a test with a new spray program. . . . Its success, he admits, was unexpected, accidental. . . . His enterprise and experiences will interest other fruit growers, everywhere.

LAST summer the writer stumbled upon a spray program which had the following results: an unusually good worm control, mite and aphid control, large size and high color in the fruit, and a leaf vigor that promises a good crop in 1940. The amount of lead on the apples was so small that they were washed in cold acid alone. These results were accomplished with fewer sprays and at less cost than usual. The success of the program aroused so much interest that in the latter part of the season visitors not only from the Yakima Valley but also from Wenatchee were constantly coming to inspect the orchard. As a result of this interest, this article has been prepared.

Let it be said at once that the success of this program was unexpected, accidental. Perhaps it will not be so successful next year. I believe that it will, but do not know. Meanwhile, the writer has nothing to sell, nothing to recommend.

My orchard in Washington is not in a locality where it is easy to control worms or to get color. It is below Union Gap where they say, "You can't raise apples because you can't keep the worms out." The writer has been fairly successful in controlling worms, but at the cost of too many sprays, generally six covers on Winesaps and eight or even more on other varieties. I use no calyx spray. Control was poorer than usual in 1938 and last spring there was a large carry-over and a heavy moth flight.

My program consisted of a combination of rotenone, arsenate of lead and stove oil. The rotenone was used to fight the Pacific mite, which has been an increasing problem. It was not expected that it would be of value in the control of codling moth worms, since competent investigators had tried it for that purpose and had found it wanting. It has strong insecticidal value, but is an unstable organic compound that quickly loses its strength when exposed to heat and light.

The program was as follows: April

26, a late calyx or early cover, an ordinary spray of lead and stove oil. May 6, a spray of three pounds lead, one quart stove oil, .8 pound rotenone, a little multifilm, oleic acid and red drum. These two sprays were given all varieties. From then on, each variety was sprayed differently. Winesaps, my main variety, had two more sprays, an oil-lead spray starting May 16, the other a lead-rotenone spray late in July. For Winesaps, then, there were four sprays finished before August 1, two of which were of the lead-rotenone. Jonathans were the same with the addition of a cover August 16 of one and one-half pounds lead, .6 pound rotenone and stove oil. Romes had six sprays, of which four contained rotenone, the last August 16. Nothing will be said about the Delicious program, as it was complicated by some experiments with a new proprietary mite killer. Suffice to say that the same lead-rotenone-stove oil combination gave the same satisfactory results on Delicious.

This spray program was started with no thought that it would be unusually effective in worm control. It was expected that the usual number of sprays would be necessary, six for Winesaps and at least eight for other varieties. By June 1, it became apparent that there had been unusual codling moth control. There were few worm entries and moth flight was very low, so additional applications were delayed. In time it became apparent that the first brood had been practically annihilated. There was almost no lead left on Winesaps and Jonathans in early July; an analysis showed 35 micrograms. Still something was killing what few worms hatched. Some spraying was done for the second brood with good effect, but the real battle was won early.

Now, why was this program so successful? It was not an easy season to control worms. Was it just luck, as some say? The writer does not know, but believes it was the rotenone that gave the unusual effectiveness. But this is not a sufficient explanation.

Rotenone, as has been said, is an excellent insecticide but has failed to control codling moth worms because short lived in its effects. The true explanation of the success of the combination must be that the stove oil or the lead or both together in some way greatly prolonged the effectiveness of the rotenone. No other explanation has been found to account for the prolonged killing power. How else explain the fact that worms were killed in Jonathans and Winesaps two months after a spray application and when the lead was down to 35 mikes? How else was it possible to get along with so few sprays so widely separated?

Will this combination be successful in 1940? The writer does not know, but believes that it will. Perhaps there may have been lucky factors that favored success in 1939. On the other hand, the program was stumbled upon blindly. There was no realization till mid-summer that there was anything unusual about it. We suddenly found ourselves with a weapon in our hands that we hardly knew how to use. It is fair to think that in 1940 we can use it more effectively.

Before getting away from this phase of the subject, we must have some figures. Undoubtedly, fruit growers are asking, "Well, what was your percentage of worms? That will tell the story." Unfortunately, a definite answer cannot be given to the question. If this had been conducted as an experiment, careful worm counts should have been made in the culls, but this was not done to any considerable extent. From available data, however, it is safe to say that worms were two per cent or less in Winesaps and five per cent or less in Jonathans, Romes and Delicious. All things considered, this seems very satisfactory.

Success in fighting worms is only half the story. The other half is size, color, tree vigor and ease of washing. I have always found color a difficult matter. In 1939 color was far better than usual in all varieties. Time will not be taken for details except to say that in Winesaps the percentage of extras to fancies was 60.7 and 39.3 per cent. Color was of a very rich type; it was the best colored crop of Winesaps I ever raised. Size was also notable for a heavy crop, the packout being as follows:

88 and larger	7.3%
96 to 125	63.6%
138 to 163	24.7%
175 to 216	4.4%

The crop was about 850 packed boxes per acre of extras and fancies.

The question may be asked, "What has spray program to do with size and color?" In my opinion, a lot. I believe that the usual heavy oil-lead spray cover has a severely inhibiting effect on color and size. The two most

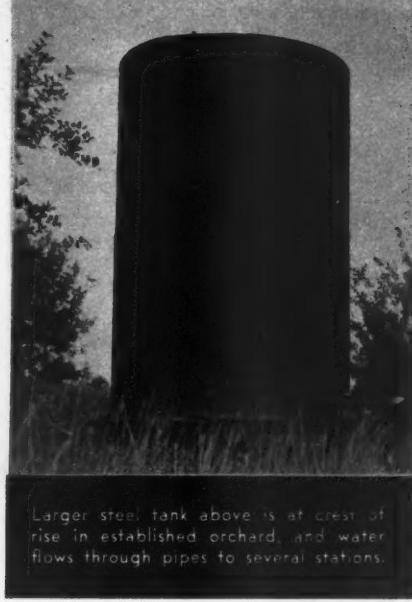
(Continued on page 28)



Top—Deep well pump used to supply water for orchard storage tanks. Above—Upright tank on 100-acre orchard.

TANKS AS TIME SAVERS WHEN SPRAYING

By WILLIAM H. ZIPF



Larger steel tank above is at crest of rise in established orchard, and water flows through pipes to several stations.



Besides serving as venting tank for spray time operations, this tank carries advertising for orchard since it is situated along main highway.

EVER since the day man discovered bursting spores of apple scab, sap-sucking citrus scales and multiple broods of codling moth, fruit growers have bent their pest control efforts toward rapid, timely spraying, dusting and fumigating. And, through the years as weather conditions, better facilities for distribution of information and increased knowledge on the part of the men who perform the insect and disease control operations in orchard and grove began to show their accumulative effects, all concerned with the nationwide task of ridding fruit plantings of pests have tried to work out ways and means of applying chemicals as fast and as completely as possible at the time they should be on the plants.

However, like so many operations that have become almost commonplace on fruit farms throughout the land, growers have paid little attention to some of the vitally important phases of the spraying operation. On a majority of the nation's orchards and groves, much valuable time actually is wasted in needless trips with spray rigs to water filling stations. It's true, however, that the progressive fruit grower has looked ahead to the annual spraytime and has located convenient tanks throughout his acreage where chemicals can be mixed and the spray tank refilled as the job of covering the orchard is being carried on.

FEBRUARY, 1940

While tanks have become by far the most popular kind of reservoir or storage for water because they can be filled during slack times and the water held for use as desired, ponds, dammed-up streams and, as the exception, cisterns, have come in for their share of glory as helpers in man's fight against insect and disease pests.

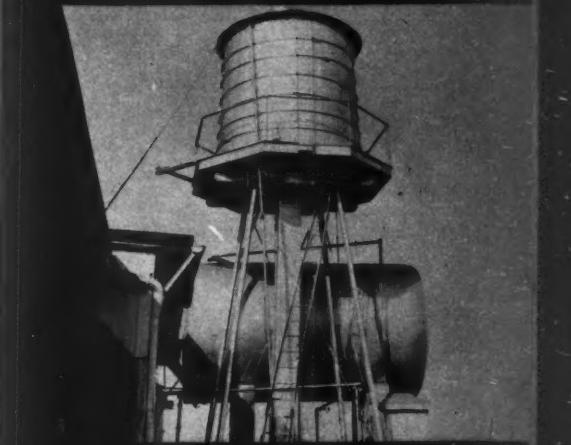
Of the tanks, the elevated type seems to be most widely used. Reason for greater use of the elevated tank is that it is easier to let water flow into portable spray rigs than it is to pump water into them. Also, water can be slowly pumped into the other end of the tank from wells or ponds over periods up to several hours, thus making it possible to keep the spray tanks filled even at the peak of the spraying season.

Growers who have depended entirely on a natural water supply have often been caught short with no water, particularly late in the season. Earth reservoirs present the problem of water seepage and excessive evaporation, worse in some sections than in others, but present to some extent in all localities.

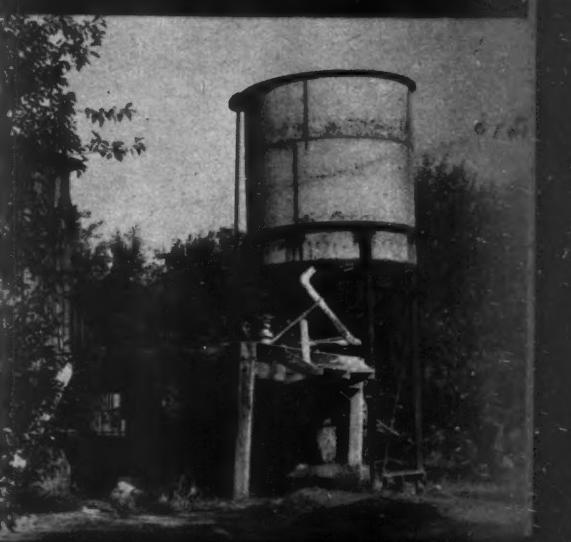
Kinds and sizes of pumps are many. The particular type used to keep spray water tanks filled depends mainly on the water supply. Coupled with the water supply amount and pump size is the size of

(Continued on page 40)

AMERICAN FRUIT GROWER



Above—Water for stationary systems is just as important as with rigs. These tanks supply water for 250-acre system. Below—Mixing platform next to this tank helps when time is worth a good deal. Steel framework supports tank.



STATE NEWS

MINNESOTA—Last fall experiments were undertaken by Dr. W. G. Brierley and R. H. Landon at University Farm to determine whether strawberry plants would acquire hardiness to the usual extent when mulched before freezing weather.

Results of these experiments are striking, showing that too early mulching of the plants may lead to serious winter injury. Much injury to the plants also occurred when the mulch was put on late, after the plants had been exposed to severe freezing weather before they were covered.—J. D. WINTER, Sec'y, Mound.

OHIO—Greatest amount spent for controlling any one crop pest in the United States is \$17,500,000 a year. "Honor" for being the nation's most difficult and costly crop pest to control goes to Codling Moth, the apple grower's No. 1 nemesis.

In 71 of Ohio's better orchards during 1939 codling moth damage was the largest factor in reducing the quality of apples. Average percentage of injuries found on fruit and their causes were: codling moth, 5.50 per cent; scab, 3.47 per cent; curculio, 1.45 per cent; other insects and diseases, 1.77 per cent.

(These figures indicate that not all growers in the State produced last year 992 blemish-free apples out of each 1000—the almost perfect record of the Heller and Yingling Orchard in Ottawa County.)

MONTANA—Solution to Montana's biggest problem—MARKETING—lies in the formation of a central organization, either co-operative or a corporation setup, to take over the distribution of all the horticultural produce of the State, leading growers in the State believe. The Montana Horticultural Society has appointed a committee to study marketing ideas. Emphasis in the committee's report will be placed on better standardization of produce, both as to quality and pack.—GEORGE L. KNIGHT, Sec'y, Missoula.

MARYLAND—The 42nd annual meeting of the Maryland State Horticultural Society enjoyed excellent attendance, with a large number of visitors from neighboring states. An impressive group of commercial exhibits lent a modern air to the meeting. Outstanding were Appalachian Apples, Inc., and U. S. Biological Survey's mouse exhibit.

Joseph G. Harrison, long identified with the Harrison nursery interests of Berlin, Md., was elected president of the society. W. Lee Allen of Salisbury and Stanley Fulton of Hancock were elected vice-presidents.—A. F. VIERHELLER, Sec'y, College Park.

CALIFORNIA—Over 1200 carloads of Bartlett pears were treated last season before shipment with methyl bromide. This new fumigant destroys larvae of the second brood codling moth which appear during early harvest and lie hidden under the calyx of the fruit. If not killed, the worms do considerable damage to the fruit in transit.

The fumigant also has been used to kill larvae in infested picking boxes. When 1600 boxes under gastight sheets were subjected to the lethal vapors of methyl bromide, a 100 per cent kill was attained.

INDIANA—Meredith Reed of Vincennes continues to guide the Indiana Horticultural Society, having been re-elected president at the 79th annual meeting. L. J. Doud of Wabash was elected vice-president.

A final survey of the records in Indiana's Quality Plus Apple Club shows that five growers qualified for gold medals with more than 90 per cent U. S. No. 1 apples, tree run in test blocks which must exceed 10 acres. These growers are: Earl Byers, Vincennes; V. V. Clarke, Bristol; L. V. Doud, Denver; A. E. Eagles, Wolcottville; and J. F. Bigley, Culver.

A total of 168 cars of Indiana apples was sold to the FSCC during the fall purchase program.—R. L. WINKLEPLECK, Sec'y, Lafayette.

NORTH CAROLINA—By using Korean lespedeza as a permanent cover crop and mulching the trees with cuttings of lespedeza and straw, Joe E. Miller of McDowell County has successfully controlled erosion in his 25-acre apple orchard, at the same time improving the bearing quality of his trees, reports H. R. Niswonger, extension horticulturist.

VERMONT—Highlights of the Vermont fruit growers' meeting: Cost of production per bushel should not exceed \$1; one may economize most everywhere except with sprays and fertilizers; two new discoveries, the use of naphthalene acetic acid spray to reduce loss from droppage, and the use of reduced oxygen and increased carbon dioxide to preserve fruit a year or more in perfect condition. Substantial evidence exists which indicates these discoveries are matters of great moment and will help to revolutionize apple growing.—M. B. CUMMINGS, Sec'y, Burlington.

KANSAS—Frank Aberle of Troy, orchardist, strawberry plant grower and manager of the Blair Co-operative Association, was elected trustee of the first district, during the 73rd annual meeting of the Kansas State Horticultural Society. Other trustees of odd-numbered districts elected were Dr. R. M. Hilfinger of Winfield, member of the firm of Wilmer and Hilfinger, orchardists, third district; Emmett Blood, peach grower of Wichita, re-elected to represent the fifth district; Bert S. Berry of Hutchinson, seventh district representative.—GEORGE W. KINKEAD, Sec'y, Topeka.

TENNESSEE—Fruit growers of Tennessee have an additional factor to consider in making their orchard planting plans. Where will their orchards be when the Government's TVA dams are all built? The waters of Norris Lake lapped the shores of J. P. Meredith's (La Follette) orchard some 20 miles above the dam and brought him a new trading element. The TVA now owns part of Clyde McDonald's young apple orchard near Dayton, where the waters of Chickamauga Lake—nearly 30 miles from the dam—will tempt the sprayers and pickers all summer. New roads and bridges are replacing the old ones reaching the Eldridge, List, Downey and other orchards near Sale Creek. Most orchards, however, are located on the hills.

When the Elrod brothers, I. T. and B. M., started their peach orchard near Clinton nearly 20 years ago, they did not have the equipment to lay off contours as we do now, so they just used their heads. Their land occupied a high knob or round hill, so they took a loaded wagon and drove around the hill, ascending gradually to the top. The tree rows were started along each side of the wagon tracks and from these base lines the rest of the trees were planted as space allowed.—A. N. PRATT, Nashville.

NEW YORK—U.S.D.A.'s Porter R. Taylor said at the 85th annual meeting of the New York State Horticultural Society at Rochester that half of a price change is due to the general price level and purchasing power and the other half is due to competition and supply and demand. In only two years since 1932 have growers sold more than 76,000,000 bushels of apples as fresh fruit. Total production of apples has perhaps not increased, but the total production of all fruits has been
 (Continued on page 34)



At an auction following the recent Grand Rapids meeting of the Michigan State Horticultural Society, Jacob Ysseldyke of the Kroger Grocery and Baking Co., paid Hilltop Orchards and Nurseries manager, Eugene Heuser, \$103.00 for a bushel of prize-winning Winesap apples.

CONSIDERING that other factors are equal, probably the most important part of the job of fighting insect and disease pests of fruit is properly functioning equipment. And of the troubles that might develop in an older spray rig, one of the most provoking to growers is loss of pressure.

R. C. Barden of Ohio State University's Department of Agricultural Engineering has worked out a series of reasons for pressure loss. He points out, for instance, that pressures are bound to drop when the hole in the spray gun disk has been worn oversize or is too large for the capacity of the outfit. Disks worn to more than one-eighth of an inch opening are too large. A ready solution to this problem is use of a new disk.

Another trouble that Barden always looks for when checking over a grower's sprayer that has had a pressure drop is air leaks in the suction line from the tank, either from a loose hose nut, a missing hose nut gasket or a worn or broken suction hose. Clogging of the suction screen in the tank will also lower pressures. Tanks, therefore, should be cleaned frequently and screens checked.

If drain cocks are not fully closed, air is admitted which is sure to lower the pressure. Particles sticking on the regulator valve seat so that the valve ball is not seating properly is another cause for the same difficulty. After sprayers have been in use for some time, regulator valve balls and seats may be so worn that they will no longer hold and replacement is necessary.

While check-up on valves is always a good practice in maintaining desired pressure, a careful grower will see that gaskets underneath pump valve seats or cages are not missing or defective. When worn-out valve seats or valve balls in the base are replaced, it is well, also, to renew both the gasket under the cage and under the valve cap. And, to insure against leakage, whenever new gaskets are installed, let the pump run a few hours and then retighten valve cages and caps. A wrench made especially for removing cages is usually supplied by the manufacturer. When the wrench is in place on top of the cage, tap it lightly with a hammer before trying to turn it. This will loosen the threads, making cage removal easier.

Most worn plunger cups are easy to find, explains Barden, because plungers show leaks. If such leaks appear, cups should be replaced. Uneven pressures or jumping of the hand on the pressure gauge usually can be traced to an air leak or an intake or discharge valve in the base not seating properly. When the latter is the trouble, remove and clean valves and seats.

FEBRUARY, 1940

CHECK UP ON SPRAYING EQUIPMENT

By JONAS HOWARD

R. C. Barden, Ohio State University extension agricultural engineer, demonstrates how he tests pressure gauges for fruit growers. Should the gauges prove faulty, Mr. Barden adjusts them at fruit meetings for correct readings.

Spray rig engines must be in top condition if proper pressures are to be maintained. This means constant checking and care as fruit grower shown below is doing in preparation for busy spraying season just ahead.



AMERICAN FRUIT GROWER



To maintain pressures of around 400 pounds, rigs with pump capacities of 10 gallons per minute should have four horsepower engines, those with pump capacities of 20 gallons per minute operate best with engines of 12 horsepower rating, and when the pump delivers 35 gallons a minute the engine size should be about 20 horsepower. In maintenance of pressures, constant delivery of power to pumps by engines is as important as proper pump action.

Since any corrosion to metal pump parts means loss of efficiency and subsequent variance in holding desired pressures, it is important to keep all pump parts in the best of condition. On this point, Barden recommends that "Many spray chemicals now used are quite corrosive to metals. For that reason it is wise to flush out the sprayer thoroughly at the end of each day's work. This can be done by pumping fresh water through all the sprayer parts, letting enough flow until discharge from the gun or broom comes out clear."

To cover a point brought up by many growers when this procedure is suggested, Barden says: "On sprayers where the suction line can be removed from the tank, this (flushing) can be done quite easily. . . . Where the line cannot be removed, it is advisable to tap onto the suction line so the fresh water may run through the sprayer and clean out all the valves and lines."

For the purpose of measuring pressures and informing growers
(Continued on page 43)

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MORE Protection
AT Lower COST

Mixed spray programs using Alorco-Cryolite are proving to have definite advantages in the control of codling moth on apples. There is reliable indication that for other fruits and ground crops *Alorco* Cryolite is going to show equally advantageous results.

In heavily infested apple orchards this insecticide is being used for covers in the later half of schedules. As a result, worm count is reduced, and the insecticide cost is lowered both on a per-acre and per-box-yield basis, as compared with controls using other insecticides.

Send today for the new booklet summarizing the development of cryolite insecticide. Titled "Quotations from Published Data on Cryolite as an Insecticide," it gives authentic data from independent experts. In it are answers to your questions about the use of *Alorco* Cryolite in protecting apples, peaches, beans, soybeans, tomatoes, corn, cotton, tobacco, cabbage, sugar cane, and other crops.

SEND FOR THIS FREE BOOKLET



Aluminum Ore Company, c/o
ALUMINUM COMPANY OF AMERICA,
1909 Gulf Building, Pittsburgh, Pa.
Send me the Free "Quotations" booklet.

Name _____

Address _____

City _____ State _____

ALORCO

CRYOLITE INSECTICIDE



Single peach twig showing leaf drop produced by lead arsenate. Note also dead buds and new growth at terminal end of twig.

FLUORINE SPRAYS

(Continued from page 14)

in the well water at the rate of one part per million, it is capable of causing mottled enamel on teeth of residents. The assumption was made that fluorine on apples in similar amounts would be harmful.

The work at the Tennessee Agricultural Experiment Station showed that fluorine when present in water supplies used for drinking and cooking is toxic, while cryolite spray residues as occurring in practice are not. It was also shown that when fluorine occurs in the water supply, more fluorine may be swallowed through the process of cooking than through drinking.

The consumption of water is over 30 times as great as that of sprayed apples. Many everyday foods, such as sardines, salmon, tea and baby foods, contain fluorine up to 12 parts per million; yet mottled enamel has been produced by no other means in the United States than the continued ingestion of water containing toxic amounts of dissolved fluorides during the period of calcification (between birth and eight years of age) of the crowns of the permanent teeth. The Public Health Service refers to mottled enamel as "a water-borne disease associated with the ingestion of toxic amounts of fluorides present in the water used for drinking and cooking during the period of tooth calcification."

As a result of this finding, the fluorine tolerance has been changed to .02 grain per pound. The situation warrants, however, that no tolerance on fluorine as cryolite is necessary or at the most should be .1 grain per pound of fruit. To comply with a tolerance of .02 grain of fluorine requires expensive equipment and heated hydrochloric acid which is often injurious to the apple, but a tolerance of .1 of a grain could be met by the use of simpler equipment, unheated acid and with greater satisfaction to the consumer and grower alike.

Peach growers are well aware of the extensive leaf dropping caused by use of

(Continued on page 26)

You will have BETTER SPRAYING—

Dependable High Pressure . . .
Lowest Cost . . . Fewest Repairs

*when you are
using the*

SIMPLEST PUMP

*Why have so many successful growers changed to
"Friend" Sprayers? Why do they write reports like these?*

"Of our four different makes of sprayers, the 'Friend' has given steadiest performance and least trouble" . . . "The 'Friend' is so far ahead of other sprayers I have used that there is no comparison—the most efficient and cheapest to use" . . . "The 'Friend' has no equal for excellent service and reliability" . . . (Read these and other reports, with names and addresses, in the new "Friend" Catalog)

Here are just four of the reasons why thousands of prominent growers prefer the "Friend":

The Simplest Pump built for high-pressure spraying. The "Friend" pump has fewest parts—and strongest parts. You make a big saving in repair costs.

Timken Roller Bearings give you the greatest possible Dependability. There is not a plain sleeve bearing anywhere on a "Friend" Sprayer.

Easiest lubrication; oil bath gears, and Alemite fittings.

No Cups or Pistons—the plungers ride in lubricated packing which has far more contact surface than a cup. No wear whatever on the cylinder walls.

Most practical design, all through. Valves and controller are on the outside, easy to get at for cleaning. Valves have threadless seats that don't stick. Packing can be tightened instantly, without even stopping the pump.

When you own a "Friend", you will have the sprayer that does your work with

MOST SATISFACTION and LEAST TROUBLE

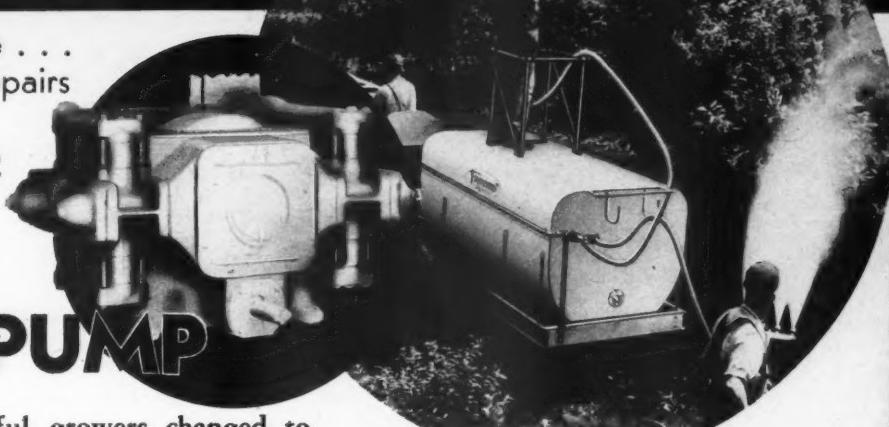
Mail the Coupon for the New "Friend" Catalog

"FRIEND" MANUFACTURING CO., Gasport, N. Y.

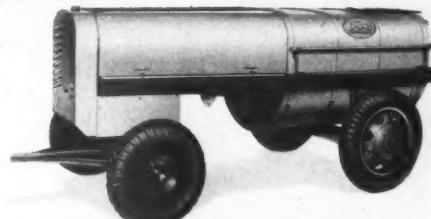
"FRIEND"

SPRAYERS • DUSTERS • FRUIT SIZERS and CLEANERS
FEBRUARY, 1940

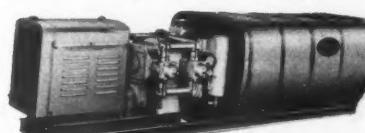
AMERICAN FRUIT GROWER



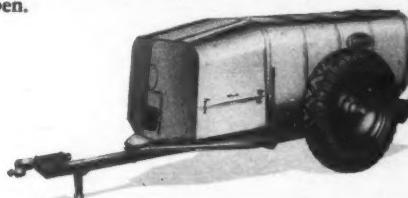
Sprayers of Any Size—any Chassis Style.
Capacities from 5 to 70 gallons per minute. Pressures up to 1,500 lbs. All types of mountings including Combinations, Estate sprayers, and the three popular styles shown below.



Cutunder style, originated by "Friend," with short-turning four-wheel trucks. Complete spraying outfit, with power.



Skid-Mounted sprayers for use on trucks—with power take-off, or complete with motor. Streamlined or open.



Tractor-Trailer sprayers, with pump driven by the tractor. Streamlined or open.

Streamlined to guard the TREES—Not the PUMP. The pumps of the "Friend" Sprayers shown above are fully enclosed, and can be cleaned off with a hose. The new "Friend" Catalog gives a clear description of the most Reliable and Economical Sprayer pump ever built.

"FRIEND" MFG. CO., Gasport, N. Y.

Send your new Sprayer Catalog, explaining the "Friend" pump and showing all types of mountings, to

Name _____

Address _____

(I have _____ acres of _____)
(Kinds of fruit)

PAGE 23

NEW TESTS* AGAIN PROVE ADVANTAGES OF

NICO-SOL SUMMER SPRAY OIL

EXTENSIVE TESTS in comparison with several other codling moth control treatments prove NICO-SOL a superior value — possessing all the advantages of the best oil-nicotine compounds, yet costing less to use. NICO-SOL Summer Spray Oil also eliminates the cost of washing and offers these added advantages:

- 1. No arsenical injury.
- 2. Fewer sucking insects.
- 3. Lower costs.
- 4. Production of larger, better-finished fruit.

More and more successful Fruit Growers are enjoying the advantages of NICO-SOL Summer Spray Oil



Superior foliage is a typical result of NICO-SOL Summer Spray Oil



Poor foliage frequently results from use of strong caustic sprays

MAKE A COMPARATIVE TEST YOURSELF!

Prove to your own satisfaction the superiority of NICO-SOL Summer Spray Oil. Use it in your own orchard this year. Keep a part of your orchard on the same treatment you followed last year, if you wish, but wherever infestation was severe last year be sure to use NICO-SOL this year. Keep a record on both treatments, including costs and crop yield. Then compare the results!

★ During the summer of 1939, at the Test Orchard near Fennville, Michigan, a comprehensive test was conducted to determine clearly and conclusively the comparative codling moth control efficiency of NICO-SOL Summer Spray Oil and several other types of spray treatment. Each spray treatment was tested on duplicate plots under extremely severe conditions. These tests proved conclusively the dependable efficiency and the economy of NICO-SOL Summer Spray Oil.

For further details of the 1939 Orchard Test call or write your nearest Standard Oil Company (Indiana) office.

OTHER STANDARD OIL COMPANY SPRAY OILS

DENDROL DORMANT SPRAY OIL

An all-purpose highly uniform dormant spray oil.

STANDARD APHID SPRAY OIL

A positive dormant, one application Aphid control.

SUPERLA SUMMER SPRAY OIL

Ideal for use with fixed nicotine or nicotine sulphate.

Write for your copy of the NEW booklet "Facts for Fruit Growers About Standard Oil Company Oil Sprays"

STANDARD OIL COMPANY (INDIANA)
910 SOUTH MICHIGAN AVENUE, CHICAGO, ILLINOIS

A 1939 TEST PROGRAM

(Continued from page 11)

would be useful as a contribution to a more definite appraisal of the relative advantages and disadvantages of these five typical spray treatments than had heretofore been available.

For this purpose, a solid, uniform, seven-acre block of Hyslop Crab apple trees in the Tucker orchard near Fennville, Mich., was selected. This block provided an exceptionally good test location, tending to establish dependable comparisons, since its moth population was very high due to conditions that had permitted heavy build-up previously, thus subjecting all treatments to severe test conditions. The crop was medium to light, thus introducing another difficult control condition. Crab apples, rightly or wrongly, enjoy the reputation in Michigan of being one of the hardest of all apples to keep clean of codling moth injury.

Replicated plots, distributed at representative locations, each consisting of a square of nine trees each, were used in the experimental setup.

Prior to the beginning of experimental comparisons, the block was sprayed with the usual prebloom fungicidal schedule and with a calyx and two cover sprays of arsenate of lead at two to three pounds per 100 gallons in the calyx and at four pounds in the cover sprays.

Beginning with the third cover spray on June 20, the experimental plots were sprayed with the following materials (amounts given being for each 100 gallons of spray):

Treatment

No. Materials

1 Arsenate of lead—3 to 4 lbs.
Lime—3 to 4 lbs.
Soybean flour— $\frac{1}{2}$ lb.

2 Arsenate of lead—3 lbs.
Summer oil—2 to 4 qts.
Conditioner— $\frac{1}{2}$ to $\frac{3}{4}$ lb.

3 Fixed nicotine (proprietary)—4 lbs.
Summer oil—2 to 3 qts.

4 Nicotine sulphate—1 pt.
Bentonite—5 lbs.
Soybean oil—1 qt.

5 Oil-soluble nicotine oil—2 to 3 qts.
Conditioning powder—1 lb.

Six cover sprays of the above treatments were applied, each beginning on the following dates: June 20, June 27, July 6, July 24, August 7 and August 22.

In treatment No. 1, lead was used at four pounds in the first and third sprays and at three pounds in all others. Soybean flour was omitted in the last two sprays.

In treatment No. 2, summer oil was used at four quarts in the first two sprays, at three quarts in the next two, and at two quarts in the fifth spray. This plot was not sprayed at all on August 22.

In treatment No. 3, summer oil was used at two quarts in the second, fifth and sixth sprays, and at three quarts in all others.

In treatment No. 4 (tank-mix nicotine-bentonite), the nicotine-bentonite-soybean oil combination was replaced by nicotine sulphate (one pint) plus summer oil (two quarts) in the last two sprays.

In treatment No. 5, the summer oil containing oil-soluble nicotine was used at two quarts in three sprays and at three quarts in three sprays, the same as in treatment No. 3.

The results, as checked at harvest time in mid-September, in terms of codling moth control, red spider control and condition of foliage, are shown in the table on page 30. They represent condition of the entire crop.

(Continued on page 30)

FEBRUARY, 1940

Are all LEAD ARSENATES the Same?

A SUBJECT EVERY GROWER SHOULD INVESTIGATE

THE statement is often made that "Arsenates of Lead are all the same." This idea has its foundation in the fact there is a standardized arsenic oxide content for Arsenates of Lead.

While it is true that Arsenates of Lead do not vary much in arsenic oxide content, there are marked differences in their physical properties. This is proved by the fact that certain Arsenates of Lead will remain in suspension for a considerable length of time, particularly those that contain a deflocculator, but these Arsenates of Lead finally settle into a compact mass which is hard to get back into suspension if allowed to stand a day or more.

Arsenates of Lead that do not contain a deflocculator settle more quickly, but into a loose, fluffy layer that readily goes back into suspension even when allowed to stand for several days. Sherwin-Williams Arsenate of Lead is the best example of the latter type.

Since codling moth control is in direct proportion to the amount and character of the Arsenate of Lead coating and its "weathering" properties, Sherwin-Williams, in addition to producing the most efficient and the largest selling Arsenate of Lead, also developed S-W Spralastic to be used in combination with Arsenate of Lead as a spreader and unrivaled deposit builder.

S-W Spralastic has proved a real boon to growers who want positive first brood control. It literally doubles the effectiveness of Arsenate of Lead sprays. Acting as a deposit builder, spreader and flocculator, S-W Spralastic causes more Arsenate of Lead particles to stick on impact and spreads them evenly. In fact, 2 pounds of S-W Arsenate of Lead with 1½ pints of S-W Spralastic to 100 gallons of water gives a deposit equal to that obtained when 3 pounds of Arsenate of Lead to 100 gallons of water is used without Spralastic.

Field tests with 3 pounds of S-W Arsenate of Lead and 1½ pints of S-W Spralastic give a deposit of 260 micrograms per square inch immediately after spraying and 147 micrograms per square inch some 65 days later at harvest time.

"FILM OF PROTECTION" FOR BETTER CONTROL

When the combination of S-W Arsenate of Lead and S-W Spralastic is used, the result is a heavy, uniform, elastic "Film of Protection" which not only assures better first brood control, but reduces the number of second brood sprays and thereby simplifies the cleaning problem.

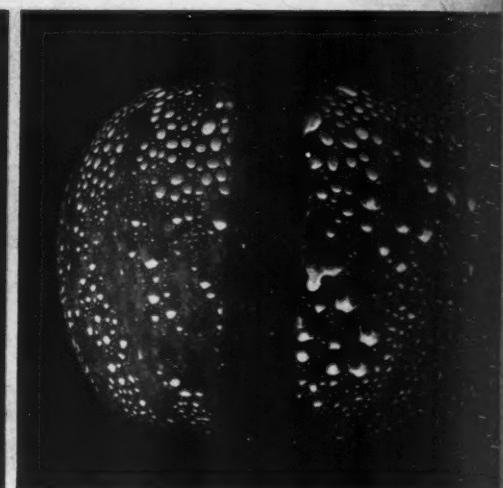
Extensive field tests also show that S-W Spralastic is very effective as an ovicide.

FEBRUARY, 1940



● Lower left—When S-W Arsenate of Lead is used in combination with S-W Spralastic and Summer Mulsion, a high percentage of lead arsenate remains on the fruit in a heavy, uniform film which affords maximum protection against worm entry. The narrow strip has been wiped clean to illustrate depth and uniformity of coating.

● Lower right—On this apple, sprayed with Arsenate of Lead alone, 85% of the Arsenate of Lead has run off. The deposit remaining on the fruit is not evenly distributed, being thinly spread on the upper portions and blotchy on the undersides. Narrow strip is wiped clean to demonstrate the shallow, spotty coverage.



against codling moth eggs when used alone and therefore can be used in conjunction with S-W Summer Mulsion to destroy eggs of codling moth.

Where a combination of 1 pint of "Standard" S-W Spralastic is used with 1/2 gallon of

Prevent Arsenical Injury with S-W SAFE-N-LEAD

S-W Safe-N-Lead is a patented zinc compound in convenient form for use with Arsenate of Lead sprayed on apples and peaches to prevent arsenical injury to fruit and foliage. Its use also improves coverage of Arsenate of Lead, in addition to reducing the water soluble arsenic content well below the danger point.

Three pounds of Arsenate of Lead alone to 100 gallons of water, under 15 minutes agitation, showed .4% water soluble arsenic.

Three pounds of Arsenate of Lead with 1 pound of S-W Safe-N-Lead to 100 gallons of water, under 15 minutes agitation, showed only .13% water soluble arsenic.

S-W Safe-N-Lead by neutralizing a greater part of the water soluble arsenic preserves the foliage intact and permits normal functioning of the leaves and, consequently, proper development of the fruit.

For 1940 plan to maintain heavy, uniform coating of S-W Arsenate of Lead during the first 8 to 10 weeks after bloom, especially on late varieties, and "safen" with the new S-W Safe-N-Lead.

S-W Summer Mulsion and 3 pounds of S-W Arsenate of Lead to the 100 gallons of water, practically a 100% kill of eggs hit with spray will be obtained and a very heavy coating will result.

The S-W Spralastic-Summer Mulsion-Arsenate of Lead combination is especially valuable for first brood sprays where an ovicide is required as well as a heavy deposit to protect the rap-

idly growing fruit against codling moth larvae.

Surprising as it may seem, the S-W Arsenate of Lead, S-W Spralastic and Summer Mulsion combination is an economical program because heavier deposits are maintained, resulting in control with fewer sprays. It costs no more per spray and requires fewer sprays. Experience proves that the number of sprays required is reduced 25% to 40% to obtain equal or better control. S-W Spralastic sprayed fruit colors normally. This is due to the fact that the coating is translucent for a considerable period after application and to the uniform coverage.

S-W SPRALASTIC DOES NOT COMPLICATE CLEANING FRUIT

● The extremely uniform coating obtained with the S-W Arsenate of Lead and S-W Spralastic combination removes as easily as an ineffective spray program. In the latter instance, the coverage is blotchy, particularly on the undersides of the fruit, due to the runoff. The S-W Spralastic coating is just as uniform on the shoulders as it is on the undersides of the fruit. And it is well to remember that it requires a more intensive washing to remove heavy "spots" on sprayed fruit than it does to remove a uniform film. This fact has been proved by hundreds of residue analyses.

In view of all these considerations the thinking grower in planning his codling moth control program for 1940 will definitely consider—and then use—this combination: S-W Arsenate of Lead with Safe-N-Lead, S-W Spralastic and S-W Summer Mulsion.

THE SHERWIN-WILLIAMS CO.

Insecticide Department

101 Prospect Ave.

AMERICAN FRUIT GROWER

Cleveland, Ohio



PAGE 23



Mr. Trostel's Diesel D2 pulls the disk on less than 1 1/4 gallons of fuel per hour.

"FUEL BILL ONLY \$37.50 . . . FOR 508 DIESEL D2 HOURS,"

—E. B. TROSTEL, ADAMS COUNTY, PENNSYLVANIA!

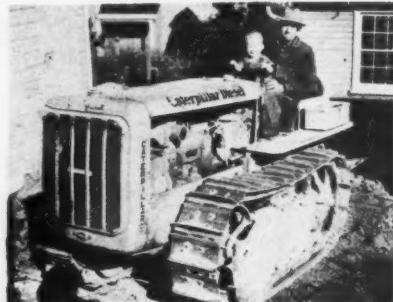
"My 'Caterpillar' Diesel D2 Tractor worked 508 hours by the hour meter, on only \$37.50 worth of fuel," reports E. B. Trostel, Adams County, Pennsylvania, fruit-grower and farmer.

According to his records, that means a saving of \$115.00 per year on fuel expense alone. "Total operating expense this year (including fuel, oil, grease) was \$79.06," adds Mr. Trostel.

"5c to spray 500 gallons"

"The Diesel D2 does outstanding work with our 500-gallon power take-off sprayer. Its fuel costs only 5c to spray 500 gallons. The fast fifth speed enables us to go back and forth much quicker (for refilling), thus getting our spray applied on time."

Traction, to meet and beat ad-



Mr. Trostel and grandson, Donald, in the D2's deep-cushioned seat.

verse conditions, of hills, soft spots or sand. A modern range of practical speeds to take advantage of non-slip traction. Diesel economy to save 60% to 80% on fuel expense. And the backing of "Caterpillar's" 35 years of experience, building track-type Tractors! Ask for a demonstration!

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

DIESEL ENGINES

TRACK-TYPE TRACTOR

TERRACERS

CATERPILLAR TRACTOR CO., Dept. A-102, Peoria, Illinois

Gentlemen: I want to find out whether I should own a "Caterpillar" track-type Tractor.

Size of orchard..... Power now used.....

How can I obtain a competent equipment survey "with no strings attached"?

Name..... R. F. D.....

Town..... County..... State.....

FLUORINE SPRAYS

(Continued from page 22)

lead arsenate. As far as foliage injury is concerned, cryolite appears to be without the slightest effect. In Tennessee we have applied as many as seven sprays in the season of 1930 without defoliation and without effect on the fruit. The control of the curculio by means of cryolite seems to be on a par with lead arsenate.

In 1935, several peach growers in Georgia tried out Dutox and cryolite but obtained a peculiar type of fruit injury. This consisted of a softening of the peach along the suture and at the tip which we are designating as "tip end" injury. In 1937, we obtained this "tip end" injury only on the Machado variety. In order to study this type of injury more carefully and to accentuate it, we used the cryolite at the rate of two pounds to 50 gallons of water in 1939 and obtained injury on all varieties, especially the early ones. The injury is very sporadic and may not occur at all in some seasons. No injury has been reported from the northern peach belt.

The past season we used magnesium oxide as a possible safener or corrective, but the results were all negative. The plots with magnesium oxide and cryolite appeared to have as much injury as the cryolite alone. The work will be continued in the hope of finding a suitable corrective. Other fluorine compounds will also be given a trial.

For the present, it would seem that a split spray schedule composed of lead arsenate in the early sprays followed by cryolite in the last two sprays would give the least foliage and fruit injury. Flotation sulphur or wettable sulphur is compatible with cryolite.

Against the apple flea weevil, the work of J. S. Houser and C. R. Neiswander in Ohio shows that cryolite is an outstandingly successful control for this pest. They used the following formula:

Cryolite	5 lbs.
Flotation sulphur	8 lbs.
Goulac	3 oz.
Water	100 gals.

One application was given during the pre-pink period and another when the apple buds were in the full pink stage. The use of this formula also gives excellent control against apple scab.

Neiswander also found that cryolite gave very effective control of the strawberry leaf roller in Ohio. Among the several materials tested, such as derris, cube and red arrow, cryolite gave the best results. Sprays and dusts were equally effective. Three applications were found necessary, consisting of five pounds of cryolite to 100 gallons of water, plus a spreader. In Kansas, R. L. Parker also obtained excellent results with cryolite and summer oil against the strawberry leaf roller.

In California, A. M. Boyce found the fluorine compounds more satisfactory for the control of the walnut husk fly than arsenicals or nicotine compounds. He recommends three pounds of cryolite and one quart of mineral oil to the 100 gallons of water sprayed at the rate of 30 to 40 gallons to an average-sized walnut tree.

Basinger and Boyce also found that cryolite was effective against the orange worm.

Sample schedules or forms like those that will be used by enumerators when they start tabulation of the 1940 agricultural census in April may now be obtained by calling on county farm agents or by sending requests to AMERICAN FRUIT GROWER. Study of these samples will enable growers to give enumerators prompt information on their orchard and grove enterprises by having the facts ready when the enumerators arrive. This is 100th anniversary for the Census of Agriculture.

MYERS Silver Cloud POWER SPRAYERS

All Styles with Steel
or Rubber Tired
Wheels



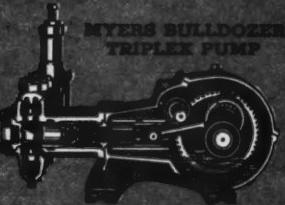
Their Steady Performance Brings Real SPEED



PUMPS THAT STAND THE TOUGHEST SERVICE

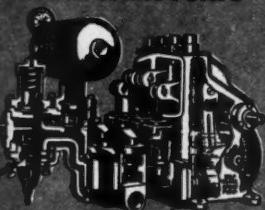
The reliable functioning of MYERS pumps furnishes the key to the remarkable satisfaction given by MYERS Power Sprayers. Silver

Cloud models are now available with pressures up to 800 lbs. when equipped with the MYERS Bulldozer Triplex Pump shown in the picture above. These new high pressure spray pumps are built like the famous MYERS Bulldozer Power Pumps which have long stood the most severe tests of heavy duty service. They have perfect and continuous lubrication. Automatic control. Roller bearing. Porcelain lined cylinders.



MYERS Self-Oiling Power Spray Pumps shown below come in Duplex, Triplex and Quadruplex models according to capacities needed. They likewise are sand, dirt and dust proof; have automatic control, continuous lubrication and porcelain lined cylinders.

MYERS SELF-OILING POWER SPRAY PUMPS



HIGH pressures, streamlining, mobility, rubber tires—none of these features can assure real speed on a spraying job if you have to be forever stopping to adjust, control or repair machinery. You can count on MYERS Silver Cloud Sprayers to go through round after round of spraying — smoothly, steadily, speedily. They have the built-in toughness that stands up under punishing service and removes the worry of mechanical delays. Their constant pressure, automatic control and easy handling, lighten the labor of the operators and assure the work being done rapidly, economically and effectively. Complete information gladly sent free.

MYERS Silver Cloud Sprayers come in various sizes and capacities, for operation by gasoline engine or power take-off from tractor. They head a line which includes sprayers of every wanted type and kind — for work in orchards, groves, vineyards, cotton, tobacco, row crops, gardens, nurseries and greenhouses. Gun

sprayers, boom sprayers and combination sprayers. Engine powered, tractor powered, traction driven and hand operated sprayers. Wheeled sprayers, stationary sprayers, and portable sprayers. Tank sprayers, barrel sprayers, knapsack and compressed air sprayers. Catalog on request. Mail the coupon TODAY.

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"PUMP BUILDERS SINCE 1870"

Send free information on items checked and name of your nearest dealer.

Name _____

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Self-Oiling POWER SPRAYERS

FEBRUARY, 1940

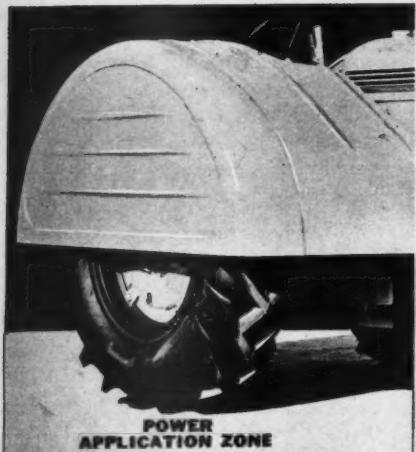
AMERICAN FRUIT GROWER

BC 406



PAGE 50

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The inexpensive complete
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Runs a whole day on a
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An all purpose small substantial power sprayer with big
capacity. The low price will amaze you. Write for literature.

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IT IS AT A
PRICE YOU CAN
NOW AFFORD TO PAY

THE SPRAYER
OF MANY
USES.



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nearest branch. Tell me more about the
Model "DO" Tractor and also
 Offset Disk Harrows Orchard Plows
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SPRAY FASTER!

Farther and Wider Too!

with the ELLTEE SUPERCHARGER
AIR-FOG Orchard Spray Gun

Automatically Injects 2 Parts
Air into 1 Volume Spray Solution!

SAVE Time and Spray Solution—Make a LARGER
VOLUME of "Air-Fog" Spray! For ALL MAKES
and SIZES of Sprayers DEVELOP 500 pounds
in 800 pounds pressure NOW in time to
INVESTIGATE this Superior Gun—Write TODAY
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ELLTEE MFG. CO., Benton Harbor, Mich.

GRAFTWAX—TREE HEALANT Heals pruned stubs,
diseases, blights, wounds. Water proof, adhesive. Graft
grafting. Heals union of stock and scion. **SMEARED ON
COLD.** Scions dipped in melted Graftwax keep indefinitely,
prolonging grafting season. Curative & cavity filler.
GRAFTWAX SEALS AND HEALS. 1 lb. 60c. 2 to 6 lbs.
50c lb. 12lb., \$5.00 Postpaid. Free Sample.
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KINKADE GARDEN TRACTOR
and Power Lawnmower

A Practical, Power Plow and Cultivator
for Gardeners, Suburbanites, Florists,
Truckers, Nurserymen, Fruit Growers
Low Prices - Easy Terms
American Farm Machine Co.
1105 33rd Av. S.E. Minneapolis, Minn.



Catalog
Free

A SPRAYING ADVENTURE

(Continued from page 18)

necessary requirements for color are as follows: (1) The tree must be thrifty and the apples well nourished. The foliage must be healthy. Its function must not be impaired by spray material nor by the de-vitalizing action of sucking insects. (2) The actinic rays of the sun must have access to the skin of the apple. The oil-lead combination violates these requirements in many ways. Oil disturbs leaf metabolism and so retards the production of elaborated sap. Heavy coatings of spray material cut off sunshine from the leaves with the same result. Oil fails to control mites, the great enemy of color. Heavy deposits on the fruit by their opaque quality hide the apples from the sun's rays and so inhibit color. Take an apple with a blotched cover and wipe it. There are white spots under the blotches of spray. Remember that the same effect exists on the whole apple to a less degree. We may wonder how apples whitewashed so thickly as some can color at all!

The writer believes that there is abundant evidence that oil-lead is an enemy to color. Last September he saw an orchard where a new spray, xanthone (known by the trade name of Genicide), was being tested for worm control. On one side of a line the trees were sprayed with oil-lead, on the other with xanthone. On the xanthone side the color was good, on the other side the apples had the characteristic oil-lead pallor. Worm control was good on both sides of the line. (At this point, please allow a parenthesis. I don't believe that we are going to use arsenate of lead much longer. Some acceptable substitute is just around the corner—let us hope closer than prosperity.)

Now, compare the effect on color of last summer's lead-stove oil-rotenone program. Because of the smaller number of sprays, the material deposited on leaf and fruit did not seriously cut off the sun's rays. Stove oil is so volatile that it does not disturb leaf metabolism. Rotenone controls the Pacific mite, the great enemy of color. Thus in every way the rotenone combination was superior to oil-lead.

Let us consider another matter. The technique of putting on enormous deposits of lead has been perfected. Every particle of lead is coated with an oily, sticky mixture that causes it to adhere to the apple. Yet in spite of frequent heavy sprays put on by this method, worm control is as difficult as ever. How often we hear growers say that their apples were plastered with lead and yet the worms went right through it. Why is this the case? A physician once said that the reason fried potatoes are so indigestible is that every particle of starch is coated with an impervious film of grease which the digestive juices cannot penetrate. Perhaps this furnishes the answer to our question. May it not be that the weak digestive juices of the minute worm cannot penetrate the gooey mix with which we have so ingeniously coated our lead particle? The worm goes right through the spray and the spray goes right through the worm. Our ingenuity has defeated its own purpose.

Apparently there was at least the usual difficulty in cleaning fruit in 1939. Perhaps the reasoning that we have just gone through can explain it. If the digestive juices of the worm cannot penetrate the oily film around the lead particle, neither can the hydrochloric acid in the washing machine. By the same ingenuity, we have made our spray both ineffective and difficult to remove.

My apples were very easy to clean as they had little lead and no oil. In past years it has been necessary to put them through heated silicate of soda in the pre-wash. In 1939 there was no heat, no silicate, no cooked apples. Cold acid did the job. No load went over the tolerance.

FEBRUARY, 1940

Something should be said as to the cost of the rotenone program. Briefly, the rotenone spray costs about one-third more per gallon than a one-half of one cent oil-lead spray. The rotenone spray controls aphids and mites, which the oil spray does not, and in this way is more valuable. The spray material cost for my Winesaps was about five and two-thirds cents per packed box. If three sprays of one-half of one per cent oil-lead and three sprays of lead and spreader had been used, the cost, figured on the same basis, would have been about six and one-half cents.

Some anticipated questions are answered as follows:

Do you recommend this spray program for others in 1940? No. It was not even an experiment; it was an accident. For two or three years it will be an experiment; then if it proves reliably successful, it may be recommended.

Will you follow this program yourself in 1940? Yes.

If anyone is foolish enough to disregard your advice and try it, is he likely to get into trouble? Not that I can see. The materials are tried and known to be safe. They cannot harm tree or fruit. The worst that could happen would be that this program would not prove more effective than the old, in which case the same number of sprays might be necessary as with the old.

Is the mix a difficult one to handle? Yes, rather. Stove oil is a wonderful spreader with lead alone and puts on a beautiful cover. But rotenone is a deflocculating agent and does not permit as good a cover. In the early season it was necessary to watch each tank mixture and add just enough red drum or similar spreader to cause flocculation. Anyone who tries this program should do it with the active advice and assistance of a competent field man from his spray company. If anyone uses rotenone alone for aphids or mites, he should not put it into water that is even slightly alkaline. Use something to acidify the water.

Since this spray program cannot be recommended, this paper has, perhaps, no immediate value. The writer can only hope that it has been interesting. Perhaps in two or three years, if we haven't adopted xanthone or something similar, the facts presented here may be of value. We are not likely again to get the high prices which we once received for our apples. If we are to stay in business, we must raise better crops at lower costs. If these facts point the way to that result, the writer will be gratified.

FIELD EDITOR RESIGNS TO TAKE STATE POST

AMERICAN FRUIT GROWER announces with regret the resignation of William H. Zipf as field editor and, at the same time, announces with no little pride his appointment as agricultural extension editor for the University of Delaware. He takes over his new duties at Newark, Del., on February 1.

Bill Zipf will be missed at state, regional and national fruit meetings, where, as the "man behind the camera" for AMERICAN FRUIT GROWER he photographed at one time or another nearly every important personage in the fruit field.

Growers whose problems came to Bill Zipf's desk via the mail will also miss his friendly advice. AMERICAN FRUIT GROWER wishes to assure readers, however, that their letters asking for information or advice on any subject pertaining to the business of fruit growing will be welcomed, given careful consideration and answered promptly by AMERICAN FRUIT GROWER Reader Service Bureau.

FEBRUARY, 1940

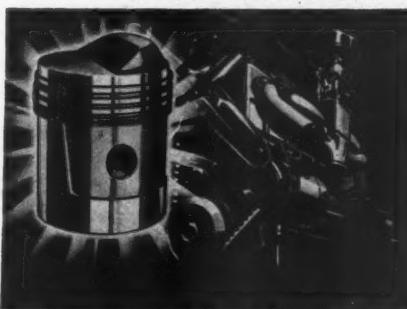


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AMERICAN FRUIT GROWER

A 1939 TEST PROGRAM

(Continued from page 24)

(both drops and picked apples) from one entire tree in each replicated plot. Approximately 3000 to 4000 apples from each treatment were closely inspected and an exact record of worm entrances and stings was made.

Treatment	% Clean	% Wormy	% Stung	% Red Spider	Foliage Condition
Arsenate of lead—soybean flour.....	72.29	3.48	24.23	Severe	Poor—very pale—considerable burn—bad defoliation.
Arsenate of lead—summer oil.....	77.17	1.60	21.23	Moderate	Fair—rather pale—some defoliation.
Proprietary fixed nicotine plus summer oil.....	82.39	2.73	13.88	Light	Good—strong color—no defoliation.
Tank-mix nicotine-bentonite.....	77.36	7.95	14.69	Moderate	Poor—excessive yellowleaf—considerable defoliation.
Oil-soluble nicotine in summer oil.....	83.07	4.93	12.00	None	Excellent—deep green—no defoliation.

On this variety, and under the conditions prevailing in the test orchard involved, the results outlined above show that so far as codling moth control alone is concerned, any one of the five spray treatments most commonly in use in Midwest orchards will give reasonably effective control.

As might be expected, the all-season lead-oil spray produced the best worm or entrance control, but proprietary fixed nicotine-summer oil was a close second in this respect, while lead-soybean flour and summer oil containing oil-soluble nicotine were not greatly inferior. Tank-mix nicotine-bentonite appears to be quite definitely inferior in worm control efficiency in this particular test, but its performance was probably weakened somewhat by the necessity of using a plain nicotine sulphate-summer oil spray in the last two applications in order to mask the extremely heavy, paint-like deposit of the nicotine-bentonite mixture.

So far as total codling moth blemishes are concerned, all the nicotine sprays were superior to the lead combinations, with exception of the nicotine-bentonite spray.

In effects on the foliage, the lead sprays and the nicotine-bentonite were noticeably inferior to proprietary fixed nicotine-summer oil and to the oil-soluble nicotine summer oil spray. These latter two also gave good control of red spider, which probably contributed to the superior foliage condition shown on these plots.

It is probable that the adverse foliage condition produced by the lead and nicotine-bentonite sprays in this orchard was more pronounced than it would be in many other

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orchards because of some apparent previous nutritional deficiency.

One of the most vital considerations of interest to the fruit grower today is cost of production, of which the cost of the spray program is an important element. Perhaps the principal criticism voiced against the nicotine treatments as replacements for lead in codling moth control programs is the high comparative cost of materials. Realizing that this phase of the subject is one of vital interest, the following summary of actual materials cost per tree for the full schedule of six spray applications on the five treatments is given:

Treatment	Season Cost Per Tree
Lead-soybean flour	\$0.403
Lead-summer oil	0.721
Summer oil containing oil-soluble nicotine	0.844
Tank-mix nicotine-bentonite	0.996
Proprietary fixed nicotine-summer oil	1.03

On the basis of materials cost alone, a choice of which of the above representative treatments to use would not be hard to make. However, it is obvious that a consideration of final true costs and selection of a program must require on the part of the grower a study of all involved factors as applying to his individual problem. Such questions as (1) relative amount of clean fruit produced, (2) effects on foliage and on the maintenance of vigor and productivity of the trees, (3) incurrence or avoidance of residue removal (washing) costs, (4) supplementary sucking insect control values, (5) possible injuries due to washing and reduced market value of washed fruit, are all important considerations to be studied in connection with the problem of selection of the spray program best suited to insect control and other vital needs of each orchard.

It is to be hoped that the above account of a comprehensive and accurately conducted test on the five principal "standard" codling moth control methods in use at present in Midwest orchards may make some contribution toward a clarification of their respective values.

NICOTINE-BENTONITE

(Continued from page 10)

protection from these diseases. Our present intention is to continue the sulphur application in the first and second cover sprays (quantity to be determined by weather conditions) and not to start the soybean oil earlier than the third cover for first brood. This will impair control of first brood to some extent, but it is possible to build an effective covering on the fruit with the nicotine-bentonite-oil combination with one heavy application. This third cover containing the soybean oil should come about the time of the maximum hatch of the first brood. Then, if needed, we plan to make an application of 3-3-100 Bordeaux, between first and second broods.

Should any growers be contemplating using this tank-mix nicotine-bentonite schedule, they will find the pamphlet on the subject issued by the U.S. Department of Entomology very essential. Where codling moth control is the important factor that it is along the southern belt of the commercial apple section, this program is most promising and worthy of careful test by growers.

Contrary to rumors since war broke out in Europe, there will be no shortage of potash fertilizers during the coming season, according to recent announcement by the American Potash Institute. There are several sources of United States production which will insure a supply of this fertilizer.

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CONVENTION NEWS

THE 55th convention of the American Pomological Society was held at Worcester, Mass., January 2-5, 1940, with the Massachusetts Fruit Growers' Association as the host society. The meeting brought together many important personages whose contributions on the program were notable.

Fruit growers and dealers will be glad to know that Dr. W. C. Dreessen, U.S. Public Health Service, Washington, D.C., promised that a report dealing with spray residue research will be ready sometime before July 1. This research work was conducted at Wenatchee, Wash., during 1938. More than 1200 persons were subjected to clinical study during the year. Persons actively engaged in spraying and thinning and others who were exposed to lead arsenate, together with consumers of sprayed fruit, were subjected to critical study in order to determine the effect of lead arsenate on human beings. Dr. Dreessen's paper gave a clear statement as to procedure, but stated that the results of these investigations could not be made public until later.

On Wednesday, Dr. H. E. Barnard, research director, National Farm Chemurgic Council, Columbus, Ohio, in his address stressed the great need for extended education to make consumers realize the great value of apples in the diet. Children in particular need raw apples. Dr. Barnard pointed out that if the 30,000,000 school children in the United States were supplied with an apple every day for lunch, it would require more than 200,000 bushels every day to meet this demand. Dr. Barnard has been of great assistance in translating the findings of research workers into the language of the layman. The apple institutes now have a body of new health information which is invaluable in the advertising fields.

John Chandler, president of the New York-New England Apple Institute, and Truman Nold, manager of the National Apple Institute, explained the work of these institutes. C. B. Denman, agricultural counsel for the Chain Store Group, Washington, D.C., told of a number of things that growers might do to increase apple sales. He emphasized the need of better grading and better quality. Thomas H. O'Neill, manager, New York-New England Apple Institute, New York City, explained what grocers might do to increase apple sales. W. B. Farmer, Hampton Falls, N.H., made a strong plea for standardization in size of fruit packages. Farmer expressed the opinion that packages which hold the same amount of fruit would go far to stabilize markets. He questioned the wisdom of using the New England crate because it measures one and one-fifth bushels.

President B. S. Pickett was the speaker of the evening at the annual banquet. His topic was "An Orderly Apple Industry." He made a plea for a national committee of apple men whose function would be to establish through governmental devices a system whereby total supply of interstate shipments of apples could be regulated year to year to balance total supply with

demand and thereby stabilize apple prices. Porter R. Taylor, chief, General Crops Section, Agricultural Adjustment Administration, U.S.D.A., Washington, D.C., explained how the Federal Surplus Commodities Corporation had assisted fruit growers through the purchases of fruit. He pointed out, however, that growers should not expect the Federal government to continue its purchase program every time the fruit crop exceeds the demand. Whenever the commercial crop of apples is around 75,000,000 bushels, Dr. Taylor said that growers could make some money, but when production was upwards or beyond 100 millions of bushels, prices have always been too low to yield a profit to the grower. Some specific things Dr. Porter recommended growers might do to improve their economic position included: Removal of old, unproductive trees; elimination of varieties for which there is no longer a market demand; and, perhaps of major importance, keeping low grade fruit and culls off the fresh fruit market. Such fruit has some live stock feeding value and should so be utilized, if a by-products outlet is not available.

In Canada last fall, upon the declaration of war, fruit growers found themselves without an export market. Since Canadian growers have to depend on the export market for the disposal of a large part of their crop, drastic steps had to be taken. Col. R. L. Wheeler, Marketing Service, Ottawa, stated that the government prorated each of the provinces as to the amount of apples that might be shipped into various consuming centers and that large amounts of apples were purchased by the government for processing into canned and dried apples.

Prof. R. A. Van Meter presided at the orchard management forum, in which a dozen well informed fruit growers described some extremely interesting individual practices. Other timely subjects which were on the program included a round-table discussion on grades and grading, and orchard insect and disease control. Dr. J. R. Magness, U.S.D.A., Beltsville, Md., presented the ever timely and important subject of supplying nitrogen to apple trees. Boron problems of apple trees was subject dealt with by Dr. A. B. Burrell of Cornell University.

Resolution

The following resolution was passed by the society:

WHEREAS, fruit growers and all other producers benefit materially by the broadening of markets for their output, and

WHEREAS, efficiency in retail distribution results in lower retail prices and greater consumption of farm products, and an increase in the producer's share of the food dollar, and

WHEREAS, efforts are being made in many states to impose discriminatory taxation on certain types of food retailers who have been very helpful in the retail distribution of fruits, and

WHEREAS, discriminatory taxes have been condemned by leading national farm organizations,

THEREFORE, BE IT RESOLVED, that the American Pomological Society condemns all types of discriminatory and punitive taxation designed to hamper or destroy any legitimate type of retail distribution, and

BE IT FURTHER RESOLVED, that copies of this resolution be forwarded to members of the Ways and Means Committee of the House of Representatives and the Finance Committee of the Senate, and to all state pomological and horticultural societies.

Wilder Medal Award

The following exhibits were recom-

(Continued on page 35)

FEBRUARY, 1940

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STATE NEWS

(Continued from page 20)

higher in the last three years than ever in history.

****A fundamental change in all marketing is: Marketing decisions are now made by growers instead of by trained handlers. Unfortunately, too many growers know too little about marketing, and this is perhaps the weakest link in the fruit chain of today. (ED: Word to the wise is sufficient.)—H. B. TUKEY, Geneva.

VIRGINIA—Twenty-million pounds of apples were converted into approximately a million gallons of vinegar and a million cans of apples and applesauce by the Shenandoah Valley Apple Cider & Vinegar Company, one of the oldest processing concerns in Virginia, in 1939. Sales amounted to more than \$400,000, representing one of the best seasons in the 29-year history of the company, among whose stockholders are more than 30 Virginia fruit growers. (A boom year is expected for applesauce in 1940 elections.—Ed.)

FLORIDA—Terse, handy, well-indexed "Citrus Fruits and Health," recently compiled by the Florida Citrus Commission, encompasses within its covers the health aspects of many ailments that scientists feel will be benefited by citrus diets. In some instances the benefits seem mild to the point of being useless, but the beautiful format and authoritative quotations revive the reader's faith in modern medical research, although the impressive array of scientists' names is conspicuously absent from the paragraph, "Common Cold." The booklet, issued under the seal of the State of Florida, has been compiled principally for use by the medical and dental professions, although it is presumed the citrus commission at Lakeland will send it to other interested parties.

SOUTH DAKOTA—Mrs. W. A. Lyon, enthusiastic amateur grower, during the annual meeting of the South Dakota State Horticultural Society, told of the development of the Lyon hardy peach which comes true from seed.

H. E. Beebe of Ipswich was elected president of the society. Other officers who will serve during 1940: George W. Gurney, Yankton, vice-president; H. N. Dybvig, Colton, treasurer; Mrs. F. Briley, Dell Rapids, librarian; J. B. Taylor, Ipswich, director.—W. A. SIMMONS, Sec'y, Sioux Falls.

MASSACHUSETTS—How are you making out? Here's a test that may squeeze (and if the shoe fits—wear it). One of the generally accepted elastic percentages in fruit culture gives a rating of 30 points each for orchard care and marketing, while 10 points each are assigned to location, soil, varieties and harvesting. On this basis, John E. Rice, president of the Massachusetts Fruit Growers Association, believes that a percentage of at least 80 is necessary for success, as follows: Care, 35 points; marketing, 33 points, and three points each for the other items mentioned above. If the latter items rate as low as three points, marketing and care must receive special attention. If you rate below 80 per cent, Rice sees no possibility of meeting expenses!!!

NEW JERSEY—Dr. Firman E. Bear, veteran investigator and writer in the field of soil science, has been appointed professor of agricultural chemistry and head of the internationally known soil science department at New Jersey College of Agriculture and Experiment Station, Rutgers University.

Born on an Ohio farm which he has owned and operated the last 20 years, Dr. Bear received his B.Sc. and M.Sc. degrees at Ohio State University, majoring in agricultural chemistry. He qualified for his Ph.D. degree at the University of Wisconsin, where he specialized in soil bacteriology and biological chemistry.

A P S

(Continued from page 33)

mended as being highly worthy of the Wilder Medal award:

1. A collection of interspecific hybrids of *Corylus* exhibited by the Nut Section of the Division of Fruit and Vegetable Crops and Diseases of the Bureau of Plant Industry, U. S. D. A. (Silver medal.)

2. A new variety of pecan, U. S. D. A. 814 (Schley x Moneymaker), exhibited by the Nut Section of the Division of Fruit and Vegetable Crops and Diseases of the Bureau of Plant Industry, U. S. D. A. (Bronze medal.)

The exhibits were in charge of C. A. Reed, associate pomologist, Horticultural Field Station, Beltsville, Md. Interest in these nuts was exceptional. Mr. Reed found it necessary to remain with the exhibits in order to explain the work being done by the U. S. D. A.

Officers Re-Elected

All officers were re-elected, as follows:

President—B. S. Pickett, Ames, Iowa.

Secretary—H. L. Lantz, Ames, Iowa.

Associate-Secretary—John T. Bregger, Clemson, S. C.

Treasurer—H. C. C. Miles, Milford, Conn.

Vice-presidents in charge of:

National Apple Institute program—Kirk L. Keller, Creve Coeur, Mo.

International relationships—John Buchanan, Berwick, Nova Scotia.

Public relationships—C. E. Chase, Wenatchee, Wash.

Allied industries relationships—T. J. Talbert, Columbia, Mo.

State horticultural society relationships—G. L. Smith, Rock Island, Ill.

Spray residue research—W. A. Ruth, Urbana, Ill.

New horticultural variety lists—F. P. Cullinan, Washington, D. C.

Nomenclature—M. J. Dorsey, Urbana, Ill.

The meeting was an outstanding success and the Massachusetts Fruit Growers' Association proved to be a most hospitable host. A complete report of the convention will be printed in the Proceedings of the American Pomological Society. This volume will make a valuable record and a fine addition to any fruit grower's library.

Memberships for 1940 are now due. We can't send you your copy of the Proceedings unless we have your membership fee of \$1.25, made payable to the American Pomological Society and sent to Secretary H. L. Lantz, Station A, Ames, Iowa.

H. L. Lantz
SECRETARY

BOOKS FOR FRUITMEN

DESTRUCTIVE AND USEFUL INSECTS, By Metcalf and Flint, McGraw-Hill Book Company, New York, N.Y. SECOND EDITION.

Since 1928 this book has held the position of outstanding popular volume on insects and their relation to mankind. Brought up-to-date in this second edition, it covers those insects that are troublesome to man and to crops.

A 130-page section of the book gives appearance, habits, life history and recommended control measures for each insect now of importance as a pest of fruit plants. As with other parts of the volume, this section is profusely illustrated and a field key is provided to identify insects causing different types of injury on each kind of fruit. Included, also, is a chapter on the general subject of insect control and another on apparatus for applying insecticides.

FEBRUARY, 1940

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AMERICAN FRUIT GROWER

SCRAPING AND BANDING

(Continued from page 12)

tion than has been found in the corresponding checks.

summer. It was feared that with this serious source of infestation just outside

TABLE 1.—Percentage of Clean Fruit in the Sanitation Experiments, All Varieties, All Orchards, All Years, Yakima, Wash., 1935-39.

Orchard	Variety	1935		1936		1937		1938		1939	
		Sanitation Check									
A	Jonathan	68	36	87	80	94	89	75	69	59	49
	Winesap	81	56	91	84	92	89	91	86	70	66
B	Jonathan	73	63	83	45	42	24				
	Winesap	82	55	87	64	83	48				
	Delicious	77	55	74	38	59	36				
	Arkansas Black	82	66	82	55	63	31				
C	Jonathan							26	19	66	47
	Winesap							66	51	77	61
	Delicious							43	30	55	39
	Arkansas Black							46	34	64	41
D	Jonathan									46	22
	Winesap									76	64
	Delicious									51	37
	Rome Beauty									57	27

In orchard A, where the test has been in operation five seasons, there are only two varieties, Jonathan and Winesap. Every year from 1935 to 1939, inclusive, the crop of both varieties in the sanitation block was freer of both wormy and stung fruit than the check plot.

In orchard B, where the experiment was conducted for three years, four varieties were included in the records; Jonathan, Delicious, Winesap and Arkansas Black. In every year from 1936 to 1938, inclusive, each of these varieties showed less infestation in the sanitation block than in the check.

In orchard C, in which the experiment has now run through its second season, the varieties on which records were made were the same as in orchard B. In this orchard the sanitation plot was selected in that part of the orchard which the grower claimed to be most heavily infested. In all varieties and for both years, 1938 and 1939, the sanitation plot was cleaner than the check.

In orchard D there were the following varieties: Jonathan, Winesap, Delicious and Rome Beauty apples; and Bartlett and Winter Nellis pears.

Adjoining orchard D on the north was an unsprayed, neglected and very heavily infested orchard, which lost its crop to the codling moth and drought by late

in the sanitation block this experiment would prove an exception. However, as shown for orchard D in Table 1, the sanitation plot showed a marked increase in control for all varieties over the same varieties in the check plot, in spite of the presence of this severe infestation next to the sanitation block.

A comparison of the percentages of clean fruit in the outside row on the north with those in the rows farther in showed that the infestation from the neglected orchard crossed the road into the sanitation plot very effectively, even as far as one-third or one-half way across that plot, but that the worst of its effect was in the outside row. How much cleaner this sanitation block would have been had it not been for this outside infestation it is impossible to state.

During the 1939 season a preliminary test was made to determine a part of the control value of scraping and banding by the omission of one spray (the third cover) from the spray program. This was done in orchard A, which had been in the sanitation experiment for five seasons. The results of the sanitation treatment with five instead of six sprays, as were applied to the check and the remainder of the orchard, are shown in Table 2.

TABLE 2.—Comparison of Results of Scraping and Banding With One Less Cover Spray Than Was Received by the Check. Yakima, Wash., 1939.

Variety	Sanitation Plot (5 Sprays)			Check Plot (6 Sprays)			
	Percent of fruit	Clean	Wormy	Stung	Clean	Wormy	Stung
Jonathan	58.5	18.3	30.7	49.1	17.5	45.8	45.8
Winesap	70.0	3.4	28.6	65.7	4.6	32.7	

Although the infestation was much worse in both plots than in 1938, it is apparent that the fruit was cleaner in the sanitation plot, even with the third cover spray omitted, than in the check. There was practically no difference between the two blocks in the size of crop, except that the Jonathan apples averaged 23.5 boxes per tree in the check compared with 20.3 in the sanitation plot. In other words, the scraping and banding in this test took the place in control value of one spray application with considerably cleaner fruit to spare in both varieties.

Since the infestation in these sanitation plots is invariably greater toward the outside, particularly with surrounding infested orchards, as proved by the percentage of infested fruits and by the number of larvae caught in bands, it appears that much of the infestation in a scraped and banded block comes into it from the outside, and that if the treated block were larger or comprised a whole neighbor-

hood or district the effectiveness of this supplementary control measure would be much greater than under the conditions of these tests.

Following are some questions that may arise in the minds of growers, and I shall attempt to answer them in advance:

How much of a tree should be scraped? All of it; whenever there is any place where overwintering larvae may hide, including the base for three or four inches into the soil.

Should trees be scraped if they are not to be banded? Trees may be scraped and not banded, but only a part of the value of the whole process is gained, and about three-fourths to four-fifths of the expense has already been incurred.

Should trees be banded and not scraped? If trees are not well or thoroughly scraped, it is useless to apply bands and expect to capture any large proportion of the larvae. Unscraped trees furnish so many natural cocooning quarters for the larvae that few of them will go under the bands.

Should bands be placed on trunks, or limbs, or both? Bands on scaffold limbs will capture about 25 to 30 per cent more larvae than bands on the trunks, but at nearly twice the cost for banding materials. Bands on both trunk and limbs will catch about 50 per cent more larvae than trunk bands alone, but at nearly three times the cost for banding materials.

What is the cost of scraping and banding? The average cost for the average orchard in the Yakima Valley is about 20 to 25 cents per tree, with labor at 30 cents per hour and banding material at one cent per foot. Many growers can cut this cost in half by doing the scraping themselves, or with cheaper labor, or if their trees are smaller than the average.

Is it necessary to scrape trees every year? Yes. While the first scraping is the most important, the rough bark and other places for the larvae to hide develop continually, and, in order to assure the best results with the bands, trees should be scraped annually before moth emergence in the spring.

Is it advisable to scrape and band all orchards? No. Very little could be gained from scraping and banding orchards that are already practically clean with the present spray schedule, unless the grower desires to reduce his spray residue load by the substitution of this supplementary control measure, or for some other reason. Also, it is inadvisable to attempt to scrape young trees before they have plenty of old, rough outer bark, and the chemical bands might prove injurious to young, smooth-bark trees.

May the same bands be used for more than one year? No. By late fall of the first season the chemical bands have lost much of their strength, and by spring they are entirely worthless.

Should bands be removed in the fall or the following spring? If the bands are removed in the fall, it should be done after the last of October in order that the latest larvae to leave the dropped fruit may have an opportunity to get into them. Also, all larvae attached to the tree under the band should be destroyed and the band and its contents as well. By spring practically all larvae in the bands and between the bands and the tree will be dead, but it is best to destroy the bands then also.

When should bands be applied? In early seasons, such as 1938 and 1939, bands should be in place by June 10 to 15; in late seasons, not later than June 20.

There are many questions in connection with this sanitation problem. Some of these are already answerable; for others we are endeavoring to find the solutions.

FEBRUARY, 1940

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PAGE 38

EARLY SPRING SPRAYS

(Continued from page 9)

shell scale, scurvy scale and leaf roller, the applications must be made during the dormant stage of the buds. Fortunately, these insects are very restricted in their distribution, so, unless the entire orchard is infested, the grower usually can find opportunity to spray the infested trees. In the case of European red mite, San Jose scale, rosy aphid and bud moth, the grower by varying his materials or mixtures is able to make effective applications during the four bud stages. By taking advantage of this possibility, he can select the better days at each stage and thus make more thorough treatment, using less material per tree than would be required during windy weather.

With reference to materials, the accompanying table gives the mixtures that are recommended at present for New York, together with the action of each of the most serious apple pests that are amenable to early season treatment.

Tar-lubricating oil emulsions.—Most of the brands contain 37 per cent tar oil and 46 per cent lubricating oil. This is a proportion of two and one-half to three as referred to in the table. The reason for using the two oils is to enable growers to control European red mite and San Jose scale. If either or both of these two pests are not excessively abundant, the combination seems to give excellent results. Workers in states south of New York, where a longer season allows these pests to have more broods, claim that the mixture is not as effective as lubricating oil (three per cent) alone. This inhibition of lubricating oil by another substance is a phenomenon that was not appreciated until lately, but it has occurred too frequently to be ascribed to either chance or improper spraying.

Nicotine.—Nicotine sulphate is the form that was used in practically all the exper-

Early Spring Treatments for Apple Insects*

Materials
Amount per 100 gallons spray mixture

	European red mite	San Jose scale	Oystershell scale	Scurvy scale	Rosy aphid	Red bug	Bud moth	Leaf roller
Dormant Applications								
Lubricating oil, 3 gals.	E	E	P	P	N	N	P	N
Lubricating oil, 5 or 6 gals.	E	E	EI	E	P	F	F	N
Tar oil, 3 gals.	NN	NN	F	F	E	N	P	N
Tar oil, 4½ gals.	N	N	E	G	E	N	F	N
Tar oil, 2½ gals., plus lubricating oil, 3 gals.	F	G	E	E	E	P	F	N
Dowspray Dormant, 2½ to 3 gals.	VI	VI	E	E	E	F	E	P
Elgetol, 1 gal.	VI	VI	E	E	E	N	E	N
Breaking-Bud Applications								
Elgetol, 1 gal.	VI	—	—	—	E	N	E	N
Green-Tip Applications								
Lubricating oil, 3 gals., plus nicotine, 1 pt.	E	E	—	—	G	N	G	N
Delayed Dormant Applications								
Nicotine, 1 pt., and lime-sulphur, 2½ gals. or wettable sulphur at manufacturer's recommendations	N	P	N	N	G	N	G	N

*The letters represent the following control: E, excellent; G, good; F, fair; P, poor; V, variable (sometimes good or excellent control, in other tests fair to poor); N, not sufficiently effective to be practicable; and I, results based on insufficient data to be conclusive. A blank space indicates that no data are available.

Lubricating oil.—The oils recommended have viscosities of from 100 to 110 seconds at 100 degrees F. (as determined by a Saybolt viscosimeter) and an unsaponified residue of between 65 and 80 per cent. These oils were emulsified in the spray tank with lignin pitch which is sold under such brand names as Goulac, Binderine, etc. Use of these oils and methods of emulsification are so well known that further comment is unnecessary.

Tar oil.—The tar oil recommended is known as coal tar oil having a boiling range from 200 to 360 degrees C (392 to 680 degrees F). Water gas tar oil is not recommended unless rosy aphid is the only insect to be controlled. Coal tar oil at the proper concentrations gave excellent control of rosy aphid, oystershell scale and scurvy scale. It is not sufficiently effective for use in severe bud moth infestation. Unfortunately, it does not control San Jose scale nor European red mite, so its use is greatly restricted. The commercial emulsion is recommended since it is somewhat difficult for many growers to make good tank-mix emulsions. The concentrations given in the table refer to the actual tar oil, not the emulsion.

AMERICAN FRUIT GROWER

iments. Some of the imported nicotine is not stable, so tests were limited to the American-made preparations.

Nitro insecticides.—This term has been coined by workers at the Geneva station to cover a group in which some nitro compound of phenol or cresol is the active principle. Two brands have been tested extensively by workers of the Geneva station, namely, Dowspray Dormant (tested four years) and Elgetol (tested three years). During 1939 two other brands were tested but sufficient evidence has not been secured to permit recommendations of these newer brands. The standard set is to require two years' tests before making any recommendations, even if promising results are secured the first season. General recommendations are not made until three seasons' results indicate that the material is both safe for the trees and effective against insects.

Dowspray Dormant consists of one of the dinitro phenols dissolved in lubricating oil. It is used as a tank-mix emulsion, the emulsifier being supplied by the manufacturer. The general recommendation is two and one-half per cent concentration for apple pests. It has proved very effec-

FEBRUARY, 1940

tive in controlling rosy aphid, bud moth, oystershell scale and scurvy scale. Its effects on San Jose scale and red mite have been variable. In some tests excellent control has been secured, while in other tests the results have been only fair. More experimenting is necessary before definite conclusions can be drawn regarding its effects on these two species. It is a strictly dormant treatment and should not be used at the two and one-half per cent concentration during any later stage of the buds. In New York *Dowspray Dormant* has been used safely at three per cent on many standard varieties, but this concentration is not recommended to growers in other areas unless there is sufficient local experimental evidence to warrant the same.

Elgetol consists of one of the dinitro-cresylates with a small amount of other material. It does not contain oil and is soluble in water. It has proved very effective against rosy aphid, bud moth, oystershell scale and scurvy scale. The place of *Elgetol* in control of red mite and San Jose scale has not been conclusively determined, since the results by different workers are not in full agreement. In some instances, the control has been excellent, but in other tests it has been only fair; so more experiments are necessary before general recommendations can be made regarding these two pests. While it is a dormant spray, tests during the past two seasons indicate that there is a possibility of using it in the breaking-bud stage at one per cent concentration. There is one important point to remember in making the spray mixture. Have the tank practically filled before adding the *Elgetol*, otherwise excessive foaming may result.

All dormant materials when used at the maximum concentrations given in the table may cause some bud injury under exceptional conditions. A complete list of the factors involved have not been determined, but there is considerable evidence that trees growing in light, sandy soil, and having suffered from drought, are more liable to show injury than trees growing under better conditions. Certain varieties and weak trees of any variety seem to be the least tolerant. Usually the injury is confined to the buds and does not affect the wood. In New York experiments during the past five years in which about 5000 trees were used, the number suffering injury at concentrations given in the table have been exceedingly small. Higher concentrations have caused some damage. The percentages given in the table are considered relatively safe even for moderately weak trees in New York.

It is very important to remember that all dormant treatments cause more or less retardation in bud development and usually discolor the outer portions of the buds. Occasionally growers become unduly alarmed over these conditions, believing they have suffered injury from the treatments. Such trees by the time of blossoming, and especially after the June drop, appear no different than untreated trees. Only in case of buds that do not develop or fail to set a normal crop, as compared with untreated trees, can it be said that injury was caused by any spray material.

Finally, it cannot be emphasized too strongly that the results shown in the table were secured under New York conditions. If you live in another state, consult your county agent or the entomologists at your state college or experiment station before deciding to use any new mixture in your spring spraying program.

West Virginia University Agricultural Extension Service at Morgantown, has just published a new bulletin entitled, "Training and Pruning Fruit Trees." This new publication was written by R. H. Suds and R. S. Marsh. Dr. Marsh is head of the university horticultural department.

FEBRUARY, 1940



(Art work courtesy of Country Gentleman)

After a preliminary announcement in Science and Time in September, the effect of hormone sprays on apple drop was explained in detail in the January number of Country Gentleman. These sprays were the work of the Bureau of Plant Industry of the U. S. Department of Agriculture. We now take pleasure in announcing a product for the practical application of these studies—

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FRUITONE contains all of the chemicals in the same standard of purity and effectiveness that were used in the Government's research work described in Country Gentleman. The fruit grower who uses FRUITONE will profit from the experience of the manufacturer in making these chemicals and thus be assured of full value and reliability.

Arrangements are being made for adequate distribution so that the grower can buy FRUITONE from his usual source of supplies. Prices will be announced in May. Packages will be sized to the various capacities of commercial spray tanks.

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NUT TREE NOTES

GILBERT SMITH of Wassaic, N.Y., is an active and enthusiastic experimenter with nut trees. In a paper read before the last meeting of the Northern Nut Growers Association, he presented some recent observations on winter injury and nut tree breeding.

The winter of 1938-39 was not severe, but good growing weather in late fall kept grafts and seedlings growing so late that considerable winter injury occurred at temperatures which ordinarily do no damage. Grafts of the Fodermaier heartnut and Broadview English walnut killed back from 25 to 75 per cent, although the original trees will endure approximately -30 degrees without injury. Grafts of Carpathian walnuts growing as vigorously killed back less than eight inches or not at all. This, according to Mr. Smith, might indicate that the Carpathian walnut would endure temperatures as low as -35 degrees.

Mr. Smith has successfully crossed a selected native shagbark hickory with the Major pecan, and he has also crossed a pignut x mockernut hybrid with the Major pecan. This latter cross is regarded by Mr. Smith as unusual, in view of the differences in chromosome numbers of the species involved. He believes that it will be difficult to produce hickory species hybrids in large numbers, especially in certain combinations. The cross between a butternut x shagbark hybrid and the shagbark hickories he has made successfully both ways, but in the cross with the pecan only three seedlings were produced.

Several attempts to cross the butternut with the shagbark have also failed. He points out that although the hickory species are growing together in many parts of the country, natural hybrids between the species are rare, although the abundance of pollen available at blooming time must tend to large scale hybridization. Among several hundred hickory seedlings from trees growing near other hickory species, no hybrids have been secured.—GEORGE L. SLATE, Sec'y, Northern Nut Growers Assn., Geneva, N.Y.

NEW LOCATION

An entire special freight train was required recently to move the equipment of the Field Force Mfg. Co. from Elmira, N.Y., to Pottstown, Pa., new location of this firm which makes a specialty of producing fruit spray rigs. The move marks consolidation of the sales and manufacturing activities of the Field Force Mfg. Co. and the Ellis-Keystone Agricultural Works.

Fred S. Bateman, Field Force president, says that each firm will retain its own identity and assets. The new location, he adds, is near the Philadelphia seaport, giving a transportation advantage on shipments to the Pacific Coast and foreign countries.

***Micronized Wettable Sulfur**

Average Particle Size—3 Microns
For apple scab and brown rot of peaches.

***Micronized Sulfur Dusts**

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(Average Particle Size—4 to 5 Microns)
Dust in the rain—moisture penetrating

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20 BELT H.P.

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2½ Bushels of Ripe TOMATOES from ONE VINE

"Took about 2½ bushels from one plant 15 feet high and still going strong," writes Mrs. F. B. Mankato, Minn. You, too, can get two bushels or more of large, luscious tomatoes from one vine if you plant BURGESS Climbing.

TRIP-L-CROP

TOMATO. Two to three vines will produce enough for the average family.

TRIP-L-CROP Tomatoes rapidly grow 12 to 18 feet high. Can be grown on trellis, side of house or barn, or as a bush in garden. Beautiful, large, crimson, solid, meaty fruit of finest quality. **THE MOST PRODUCTIVE OF ALL TOMATOES.**

TRIAL PACKET 10¢ THREE PACKETS 25¢ Postpaid

RESULTS COUNT A few hundred hundreds of letters from last year's growers.

PENNSYLVANIA: "6 bu. from 2 vines"; W. VIRGINIA: "14 ft. high, over 2 bu. from each plant"; MISSISSIPPI: "9 bu. from 17 vines and still bearing"; GEORGIA: "More fruit from 250 plants than from 1/2 acre Marglobe"; MISSOURI: "About 5 bu. from plant"; SOUTH CAROLINA: "Average yield from 3 to 5 lbs. more per bush than other varieties"; COLORADO: "Vines 14 ft. tall with no rain for 87 days".

WARNING: For best results be sure to get only genuine BURGESS Climbing TRIP-L-CROP.

CASH PRIZE CONTEST Send today for FREE Garden and Nursery Book giving full details about CASH PRIZE CONTEST for growers of this new tomato.

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FOR ONLY 10¢

HARDY LILIES

AMAZING Lilies easily grown from seed—flowers FIRST year—Delightfully fragrant—a wonderful house plant as well. To INTRODUCE more of our seeds, we include with this the



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Wonderful blooms—literally smothered with ROSE PINK blooms and a sensation in summer flowering—will include



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New SUPER GIANT FLOWERING types in a RAINBOW of colors. Much finer than ordinary small flowering kinds. Semis for your now—Surprise your friends with this new GIANT.



For 10¢ all the above 5 different packets of seed. Prompt acceptance and this adv. entitles you to a NEW Novelty we will GIVE

PIKE BROS.—Growers

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On Fruit Trees. Write for descriptive catalog and send us your list of requirements. You will be amazed at the low prices on apple, peach, pear, plum and cherry trees this year.

BUY MALONEY NORTHERN GROWN TREES for best results. All stock guaranteed.

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Endorsed by Michigan State College. Moderately priced and applied cold with a brush. Used also as a protective coating for injury. Send for price list. Dealers wanted.

M. H. Hunt & Son, 510 N. Cedar St., Lansing, Mich.

PAGE 42

CUTWORM CONTROL

TO MANY a vineyard owner, and to growers of tree fruits as well, the appearance of climbing cutworms easily might be a threat to crop production. These troublesome pests, which are most numerous during cold, wet springs, start their attack early in the season, seeming to prefer as food the developing buds on a variety of fruit plants.

But, as though determined to do all they can in the way of plant destruction, climbing cutworms also feed on young leaves, blossoms and young fruit. Since they do their feeding at night, the grower must be on the lookout for them at all times during their spring feeding period.

To control these pests and others which climb plants to reach more succulent new growth, there, fortunately, has been discovered a method that is 100 per cent effective with timely use. For trees, a band of Tree Tanglefoot applied around the trunk when worms are first noticed will do the job. On grapes, the trunk and wires on both sides of the posts should receive Tree Tanglefoot bands for effective protection.

Top-working of fruit trees has been advanced by many specialists as a way to change over young, productive trees to bear marketable varieties. With increased interest in this work, several stations have issued bulletins on the subject. One of these is "Grafting and Budding Fruit and Nut Trees," by Harvey F. Tate, University of Arizona, Tucson. This bulletin explains principal grafting methods applicable to top-working as well as a discussion on budding. Both the grafting and budding operations are illustrated by drawings and photographs.

Northern Grown FRUIT TREES

Commercial Orchardists can now buy superior quality Northern grown fruit trees from one of America's larger growers. Established in 1875.

We grow 112 varieties of Apple. All the old favorites with many new varieties of proven merit including Kendall, Lobo, Macoun, Melba, Black Mickey McIntosh, etc. In Peaches, we grow 32 varieties with many of the better new varieties, including Cumberland, Vedette, Valiant, etc. Our stocks of Apricot, Pear, Plum, Cherry, and all Small Fruits are most complete.

Lowest prices on Hibernal and Virginia Crab for top working.

All stock guaranteed to be extra select No. 1 quality and absolutely true to name.

Write for Special Commercial Orchardists' Price List and tell us how many acres in your orchard, the varieties you expect to plant and how many.

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TRUE TO NAME WAYNESBORO FRUIT TREES

In a Large Assortment of Varieties, including the Outstanding New Fruits. Write for Free Copy Catalogue offering more than 800 varieties Fruit Trees and Ornamentals at reduced prices.

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100 PEACH TREES \$4.98 for PLANTERS GRADE 2-3 feet WHIPS

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Allen's 1940 Berry Book from 55 years' experience, tells how to grow and sell strawberries successfully. Describes best varieties like Premier, Catakill, Fairfax and Dorsett, also Mastodon and the other Ever-bearers. Helpful both to the experienced and beginner. Write today for Free Copy.

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Cole's fruit trees have always brought top prices—REASONS—Top quality, trueness to name, fair dealing.

For the first time we advertise a big discount. This year we have a large surplus of our usual quality stock. Take advantage of these big discounts. 40% discount on \$25.00 order—your cost \$15.00. 33 1/3% discount on \$15.00 order—your cost \$10.00. 25% discount on \$10.00 order—your cost \$7.50. Send us your requirements NOW and order from an unbroken assortment.

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600 Acres
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Reports Mr. Spellman of Michigan. You can do the same. Berries 3 times normal size, delicious as fresh fruit, or for pies and preserves. Featured in our 1940 catalog with many other money-makers including New Scotch Pear, a sensational new variety; Sweet September Cherry, the Cherry that ripens in Sept., Wayzata Strawberry, The Everbearer which produces 3 crops in 18 months. Hundreds of other superior nursery items described and pictured in

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TOWNSEND FRUIT TREES
Get your FREE copy of this 88-Page catalog in Colors. Tells all about Peach, Apple, Chestnut, Pear, and other varieties of Tree Fruits. Also describes various varieties of Strawberries, complete set of gooseberries, Blackberries, etc. Propagated from heavy-yielding strains. New Lower Prices. Send Postal Today For Your Copy.

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Scarf's FALL BEARING CHERRY

A real fall bearing sweet cherry. Fruits bright red, meaty and delicious. Tree bears at early age. **NEW SEEDLESS PEAR,** practically coreless. Bartlett quality. Also Largest and most productive varieties of Apple and other Fruit Trees, Raspberries, Gooseberries, Boysenberries, Blueberries, special list of Ornamental Fruits. Write for free Catalog. **W. N. SCARFF'S SONS** Box 231 New Carlisle, Ohio

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INTER-STATE NURSERIES, 2320 E. St., Hamburg, Iowa

FEBRUARY, 1940

STRAWBERRY LEAF ROLLER

(Continued from page 15)

larvae and has given 90 to 98 per cent control.

For the second and third generations, three applications of lead arsenate at the rate of one and one-half pounds plus one pint of summer oil emulsion to 50 gallons of water are made at 10 to 14-day intervals as soon as the first hatching larvae are noticed in each generation.

Another insecticide which has given satisfactory results on these two generations is cryolite, at the rate of two pounds plus one pint of summer oil emulsion to 50 gallons of water. These insecticides, applied to control the second and third generations, are for the protection of the plants through the summer to enable them to become firmly established and to produce a better stand for the next year's crop. If the plants were not protected, they would be severely weakened or destroyed.

A control for the first generation after the leaves have become rolled and when the larvae are larger, is to dust the plants with a 15 to 25 per cent pyrethrum dust applied at the rate of 50 pounds per acre. The pyrethrum dust will give from 85 to 95 per cent control. Rotenone and nicotine dusts, as well as phenothiazine, have not been satisfactory. Sulphur was used at one time, but with temperatures higher than 85 degrees F., severe burning of the plants resulted.

Nicotine in large concentrations of oil, under Kansas conditions, has caused severe burning of foliage.

Cost of control per acre for the first generation with the 40 per cent nicotine sulphate combination, requiring three applications or 267 gallons, is given as follows:

Nicotine sulphate, \$11 per gal.....	\$ 8.31
Labor, 18 hours, 35c per hr.....	6.30
Oil, 65c per gal.....	.98
<hr/>	

\$15.59

Cost for control of the second and third generations, requiring six applications or 1600 gallons of spray material, is itemized as follows:

Lead arsenate, 48 lbs., 11c per lb.....	\$ 5.28
Labor, 18 hours, 35c per hr.....	6.30
Oil, 65c per gal.....	1.95
<hr/>	
Total	\$23.33
Grand total.....	\$38.92

Under normal weather conditions, a grower was able to obtain a gross income of \$800 per acre. The expenditure, under normal conditions, of \$38.92 for protection and insurance of a crop is a small amount of money for such purposes.

SPRAYER CHECK UP

(Continued from page 21)

When proper pressures are being maintained, sprayers are fitted with pressure gauges. Gauges are of little value if their adjustment is faulty and they do not give a true reading of the delivered pressure. To remedy this situation and give growers an opportunity to spray with the desired pressures, Mr. Barden tests gauges for accuracy at fruit schools and Farmers' Institutes held throughout his State during winter months. Equipment for this testing is not available at every state agricultural college or experiment station, but several institutions are considering use of such equipment since its service is so helpful to growers. Several commercial firms have started similar services for growers who wish to have their gauges checked for accuracy.

FEBRUARY, 1940

REDELBERTA

(Trade Mark Reg.)
U. S. Plant Patent No. 232

PEACH

... the World's Favorite Peach in a New Dress!

The REDELBERTA Peach is a true Elberta. It has *double the red color*—and ripens fully *ten days earlier* than ordinary Elberta.

REDELBERTA reaches the earlier markets and has brought top prices.

Origin: A bud-sport limb on an Elberta tree. Discovered in 1928—10 years fruiting, testing and proving. Bearing orchards prove its outstanding color and earliness.

MORE PROFITABLE

from Washington

Season 1939, Jay Perry's (Kennewick, Wash.) REDELBERTA Peaches sold wholesale at \$1.25 per peach box. (First ordinary Elberta sold at 60c to 70c per box.) REDELBERTA was the first Washington grown Elberta to reach the market.

from Ontario, Canada

"The ripening date makes it a winner. We have no other good peach ripening at the same date. I believe your Redelberta is the best peach known to precede Elberta."

from Indiana

"Redelberta ripened ahead of Early Elberta and are certainly a beautiful peach—red all over. Had I known what they were when I purchased them I would have bought a whole orchard of them. They have plenty of color, demand top market prices."

REDELBERTA fruit for canning and drying has identical characteristics and quality of ordinary Elberta—the only difference: earlier ripening season, with fully double the color.

Reserve your Redelberta trees now!

These leading, dependable nurseries are exclusively licensed to propagate and sell genuine REDELBERTA (Trade Mark Reg.) (U.S. Plant Patent No. 232) Peach trees.

Write for circular and complete information.

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Bunting's Nurseries	Selbyville, DELAWARE
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Emlong's Nursery	Stevensville, MICHIGAN
Empire Nursery & Orchard Co.	Baileyton, ALABAMA
Krider Nurseries	Middlebury, INDIANA
May Nursery Co.	Yakima, WASHINGTON
Porter-Walton Co.	Salt Lake City, UTAH
E. D. Smith & Son	Winona, Ontario, CANADA
Tennessee Nursery Co.	Cleveland, TENNESSEE

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COCKEREL CHICKS FOR BROILERS \$2.95-100. Poults and ducks. Write for special "hatchery" to customer's price. Make saving of from 1 to 3¢ per chick by ordering direct from me. CONRAD'S JACKSON COUNTY HATCHERY, Box 17, Seymour, Indiana.

COLONIAL CHICKS LOW AS \$5.40 PER 100. WORLD'S largest hatcheries. Leading breeds. Also sexed and hybrids. Big chick almanac free. COLONIAL POULTRY FARMS, Box 1021, Shenandoah, Iowa.

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CIDER TIME—FREE TELLS HOW TO KEEP CIDER sweet, make vinegar quickly. Money from cull apples. Presses, graters, and supplies. PALMER BROS., Cos Cob, Connecticut.

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CROTALARIA SEED: SPECTABILIS, INTERMEDIA, Striata. Also Alyce Clover. Reserve now for spring delivery. GRAND ISLAND NURSERIES, Eustis, Florida.

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USE E-Z—"C" FACE PROTECTOR FOR SPRAYING lime, sulphur, oil, etc. Special E-Z—"C" feature provides clear view continuously. Protects lungs. See display ad Page 40. Write CESCO, 2308 Warren Blvd., Chicago.

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COMMERCIAL FRUIT FARM, 335 ACRES, LOCATED in Northumberland, Monongahela and Columbia Counties, Pennsylvania. Will sell as a whole or by tracts at a sacrifice. Inspection invited. THE MINERS & LABORERS' BUILDING & LOAN ASSOCIATION, 35 East Third Street, Mount Carmel, Pa.

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ROLLS DEVELOPED—TWO BEAUTIFUL DOUBLE WEIGHT PROFESSIONAL ENLARGEMENTS, 8 NEVER FADE PRINTS, 25¢. CENTURY PHOTO SERVICE, LaCrosse, Wisconsin.

PLANTS FOR SALE

CERTIFIED FROST-PROOF CABBAGE AND ONION PLANTS. Cabbages all varieties. Pareed post prepaid 25¢; 500, \$1.00; 1,000, \$1.75; Express collect 2,500, \$2.00. Onion, all varieties, pareed post prepaid, 500, \$0.60; 1,000, \$1.00. Express collect 6,000, \$2.00. Prompt shipment, safe arrival, satisfaction guaranteed. Catalog free. UNION PLANT COMPANY, Texarkana, Arkansas.

MAKE EARLY VEGETABLES AND GET TOP PRICES. Use our field grown frostproof cabbage, onion, strawberry and tomato plants. Write today for free catalog and \$300.00 cash prize entry blank. OMEGA PLANT FARMS, Omega, Georgia.

WHITE, YELLOW, BERMUDA ONIONS: 8,000, \$1.75. Charleston, Dutch, Copenhagen cabbage: 3,000, \$2.50. Blakemore, Dunlap, Dorsett, Aroma strawberries: 8,000, \$2.50 thousand. SHELDY PLANT FARMS, Memphis, Tennessee.

POSITION WANTED

EXPERIENCED ORCHARDIST WANTS FOREMAN'S place or management of good orchard. Capable of supervising other men. Pruning, tractor, sprayer, packing experience. Horticultural graduate. 29 years old. Reliable. Address Box 140, AMERICAN FRUIT GROWER, 1370 Ontario Street, Cleveland, Ohio.

ORCHARD MANAGER DESIRES POSITION IN Northeast. Twelve years experience. Agricultural school graduate. Address Box 1112, AMERICAN FRUIT GROWER, 1370 Ontario Street, Cleveland, Ohio.

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NEW ENGLAND POULTRYMAN AND NORTHEASTERN BREEDER. Special offer during the chick season. Six months for 25¢, one year for 50¢, usually \$1.00 per year. Interests new and views. Valuable editorial material on skillful breeding, practical production, and efficient marketing. Carefully censored advertising. Nationally read by poultry leaders. Subscribe now! NEW ENGLAND POULTRYMAN, 4F Park Street, Boston, Massachusetts.

STRAWBERRY PLANTS

MT. TOM (IMPROVED WAYZATA) EVERBEARING strawberry plants. Finest in strawberries. Bright color, enormous size, delicious flavor, good keeping qualities. Plants available for shipping March first. Write for prices. MRS. E. A. MURPHY, "Mt. Tom," Franklin, Michigan.

MILLIONS CERTIFIED YELLOW FREE BLAKEMORE strawberry plants from originator. \$2.00 thousand; 100,000, \$1.75 thousand; less than thousand, 50¢ hundred, postpaid. R. R. McUMBER, Greenfield, Tennessee.

DON'T PLANT STRAWBERRIES TILL YOU INVESTIGATE Rockhill Everbearing. Big, Delicious. Full crop first year. Write S. E. FISH, Eugene, Oregon.

200 YELLOW FREE BLAKEMORE OR DUNLAP plants delivered, \$1.00. Free catalog on Strawberries, Nectar-berry, Boysenberry and Fruit Trees. WALLER BROS., Judsonia, Arkansas.

STRAWBERRY PLANTS—AROMA, KLONDYKE, MISIONARY, \$2.50 per 1000. Dorsett, Fairfax, Premier, Yellow Free Blakemore, \$3.00 per 1000. Certified plants. JOHN LIGHTFOOT, Birchwood, Tennessee.

CERTIFIED FAIRMORE, DAYBREAK AND ELEANOR Roosevelt strawberry plants. FUSSELL BROTHERS, Teachey, North Carolina.

YELLOW FREE BLAKEMORE STRAWBERRY plants, \$1.50 per thousand. C. H. ROCHELLE, Kent, Tennessee.

DORSETT, BLAKEMORE, DUNLAP STRAWBERRY plants, \$2.50 per 1000. CHATTANOOGA NURSERIES, Chattanooga, Tennessee.

YELLOW FREE BLAKEMORE STRAWBERRY plants, 1000—\$3.00. WHITFORD NURSERY, Farina, Illinois.

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SAVE UP TO 75% ON TRACTOR PARTS. ALL MAKERS. Send for big 1940 free catalog. IRVING'S TRACTOR LUG COMPANY, Galesburg, Illinois.

WRITE FOR FREE LARGE 1940 CATALOG OF USED AND NEW TRACTOR PARTS. Satisfaction guaranteed. CENTRAL TRACTOR WRECKING COMPANY, Boone, Iowa.

TREE BANDS

CHEMICALLY TREATED TREE BANDS. M. A. KOELLER, Barry, Illinois.

WANTED

BEARING ORCHARD, ARKANSAS, MISSOURI PREFERRED. TERMS. Box 225, AMERICAN FRUIT GROWER, 1370 Ontario Street, Cleveland, Ohio.

Packages of bees for orchard pollination should not weigh less than five pounds, says W. E. Dunham, Ohio bee specialist. This size package is the minimum for effective pollination.

In each pound of package bees, adds Dunham, there are around 3800 bees. This number depends on the amount of honey the bees are carrying when weighed.

Mr. Dunham urges growers to insist on two-story hives when renting bees at blossom time. One-story hives may work out satisfactorily if the beekeeper removes all honey from the combs.

Of all the insects which pollinate blossoms, the bumblebee is best, but it is a solitary type and does not hive so cannot be controlled.

FEBRUARY, 1940

NEW

- AIR-FOG SPRAY GUN
- HORMONE SPRAY
- BOOKLETS

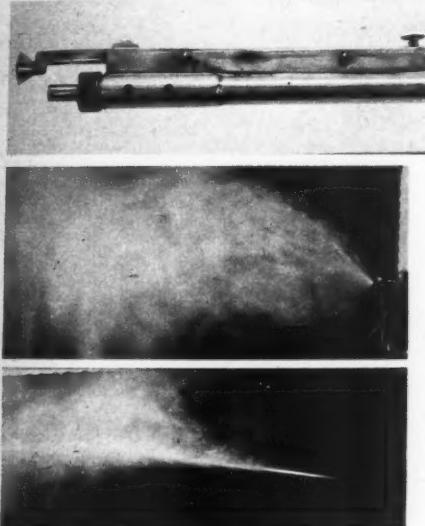
By HANDY ANDY

Have you ever thought how convenient it would be to transform fruits and vegetables into juice as if by magic and eat them without fuss of peeling and coring? With the new liquidizer and grinding machine put out by Knapp-Monarch Company of St. Louis, this seemingly magical operation is easy. The unit is used for blending liquids, liquefying fruits and vegetables and grinding nuts and coffee.

One energetic user of this compact machine that fits into any kitchen utensil arrangement has devised a health drink made up of five or six different fruit and vegetable juices.

AIR-FOG SPRAY GUN •

Weather experts say that a fog consists of moisture droplets suspended in air. So to have a real fog it's necessary to have the proper amount of air as well as moisture. Since the goal of the sprayman is



to duplicate as nearly as possible a natural fog by having a mist of spray materials enveloping his trees, engineers of the Elltee Manufacturing Company, Benton Harbor, Mich., have designed their new spray gun to produce a stream of fog made up of two volumes of air with one volume of spray solution. Such a combination, they report, results in "a floating air-fog, a wider coverage and a longer distance."

The new gun, built for capacities of from four to 40 gallons a minute, is said to produce a flat, wide spray spread of six feet in the small gun, up to 16 feet for the larger units. Distance of discharge varies from 40 up to 100 feet depending on the volume and pressure used.

The accompanying photos show a close-up of the new spray gun and discharge control that adjustments make possible with the recently introduced spraying accessory.

Jet assemblies for delivery of 10, 15

and 20 gallons per minute are made to fit the standard size orchard gun. Besides this standard size, there is a five-gallons-per-minute gun and a park gun that accommodates 30 or 40-gallon-per-minute jet assemblies. Cut-offs on the guns are in one complete assembly and the handles are of solid aluminum, screwed and riveted on stems.

HORMONE SPRAY •

One of the most important introductions in the fruit spraying scene during the past year is the new hormone type of spray that keeps apples from falling off the tree. Developed by the U. S. D. A., the new spray has just been placed on the market by the American Chemical Paint Company, Ambler, Pa. Their product is known as Fruitone.

While speaking on this subject, F. E. Gardner, U. S. D. A. specialist who has conducted work on the hormone sprays, told growers in attendance at the recent New York State Horticultural Society meeting that during the trials a block of apples received an application of the material. Shortly after the job was done it rained, so another application was made.

When the fruit had ripened for picking

the sprays had done such a good job that the fruit was hard to pull from the spurs. Gardner mentioned this incident by way of warning against overuse of the materials.

To hundreds of growers, particularly to those who during the past season experienced staggering losses from dropping, the availability of the hormone spray means just another precaution they can economically take to do away with dropping dangers.

BOOKLETS •

So many fine booklets have come to my attention in the past few weeks that I'm going to tell you about some of them.

MODERN POWER FOR THE FRUIT GROWER tells practically all there is to be told about use of crawler tractors on fruit farms. As is true of all Caterpillar Tractor Company booklets, this recent publication is filled with excellent pictures illustrating important facts in the text.

HOW TO MAKE FRUITS AND VEGETABLES PAY YOU MORE gives facts on profitable fruit display in Bemis Lenonet mesh bags. Pictures are freely used to tell the story in an interesting manner.

BIG CAPACITY HIGH PRESSURE SPRAYERS is the title of the new Hardie Manufacturing Company catalog that covers a complete line of spraying equipment and accessories. This digest of pest control machinery has fully illustrated details of construction.

AMERICAN FRUIT GROWER

FOR A CLEAN-CUT JOB Atkins Has the Edge



Leading horticulturists help design Atkins Pruning Tools. Improved Pruning Shear makes clean cuts with surprising speed without strain. Stays sharp long. 4 types. Also complete line fast-cutting, edge-holding Pruning Saws. 33 different styles to choose from. Send for Pruning Catalog.

E. C. ATKINS & COMPANY, 484 S. Illinois St., Indianapolis, Ind.

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Ask to See Them at Your Dealer

Extra Daily Fruit News Extra

Way Found to Make More Money on Fruit!

Extra Profits For Grower and Packer by Cashing in on New Fruit Merchandising Help

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GENERAL OFFICES: GRAND RAPIDS, MICH.		
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AMERICAN PACKAGES OF DISTINCTION MAKE SALES FASTER Easier and More Profitable

When it comes to increasing sales and profits on fruit and vegetables there is no better way than to pack them in the distinctive easy pack containers designed by American.

Try packing a few bushels of your better grade fruits and vegetables this modern way and note the quick reaction of your customers.

Send for complete information and samples today.
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BREADY ALL-PURPOSE TRACTOR

30% More Traction With Our Patented Front Hitch

As the load increases so does the traction. A two wheel tractor that will work along with a good team of horses. Powered with a 4.7 H.P. Briggs and Stratton motor.

The Bready develops its own traction and is capable of plowing a furrow 14" wide and 8" deep under any reasonably normal condition, and will plow 2 to 3 acres per day.

Equipment consists of all tools for general farming such as plowing, fitting, cultivation, planting, mowing, belt work, etc. Ideal for fruit growers, poultry men, nurseries, florists, small farms and gardeners. Backed by 20 years of Bready engineering.

Write for literature explaining the many advantages of the patented front hitch.

BREADY TRACTOR AND IMPLEMENT CO.
201 Aurora Rd. Solon, Ohio

PAGE 45

SUCCESSFUL ORCHARDS

● A "ROUND TABLE" PAGE FOR EVERY GROWER ●

FINDS MARKET FOR BLACK WALNUT MEATS

If a successful experience can serve as a basis for continued work with any one kind of fruit plant, we can look for R. L. Pollard of Randolph County, Alabama, to be increasing his black walnut acreage during the next few years. Mr. Pollard says:

"Eight years ago I planted two terraces to black walnuts. Today, the meats from nuts off these trees are firm, dark brown and they come out in quarters, almost as easily as pecans. The nuts themselves are the largest sized walnuts I've ever seen.

"Last winter my family found markets for black walnut meats at 40 cents per pound. It was November before they found these markets, but they sold \$20 worth of the nut meats to advertised markets and in our own home town.

"There are 10 trees to the terrace. They were not planted with the intention of selling the meats and deriving a profit therefrom. It was the tree that I wanted. For where will you find a tree that combines so many good features? It is a rapid grower, has valuable wood, bears a nut that is among the best, will grow in all parts of the country, is a fine shade tree when given room and the cost of planting is small.

"My walnut trees came into bearing when they were three years old and have continued to bear heavily every year since that time.

"It seems that walnuts yield more and better when in rows in the open than when in the timber. And they bear better on the uplands than in the lowlands. This observation was made as a result of my father planting a tree of the same variety on a low spot on his farm at the same time my trees were planted. His tree is larger than those on my place, but the nut meats are dark and watery."

DYNAMITE LOOSENS SOIL FOR BETTER DRAINAGE

LOOKING ahead to planting time, Elkhart County, Indiana, grower Daniel E. Kemp points out that "This is my way of tree planting.

"Dig a small hole about 20 inches deep. Put about a quarter of a pound of dynamite in the hole. Set the dynamite off. This will loosen the ground under the tree and a hole for the tree can be easily dug as deep as wanted.

"Loosening of the soil provides good drainage for the young trees, which I have found to be especially important for peaches and sweet cherries. I also believe that having the soil pieces split apart allows more air to get into the ground."

ADVISES USE OF RIGHTLY-COLORED MESH FRUIT BAGS

WITH mesh bags becoming more and more popular as consumer-size containers for fruit marketing, we are glad to hear from a grower who has tried them on his markets. W. E. Buckman of Summit County, Ohio, has made an interesting observation on their use which he tells about in the following paragraphs.

PAGE 46

This is a page where growers get together for an exchange of experiences and ideas. Both the beginner and veteran will find here many valuable suggestions for better and more profitable fruit growing. In return for helps you receive from this page, pass on your new ideas, methods or procedures. Just jot them down and mail to ROUND TABLE EDITOR, AMERICAN FRUIT GROWER. One dollar will be paid for each item published.

Macks didn't harmonize with the purple color of the bags. At least the package wasn't so attractive and didn't pull the buyers to my truck.

"I think it will pay those growers who plan to use open mesh bags to study what varieties they are planning to put in them and then buy the color of bag that looks best. I know that I'm going to watch this point another year."

NAILS IN TREES SAID TO HAVE INDUCED CROPPING

"I HAVE the following to add to your discussion of iron's effect on fruit trees," writes D. M. Stancliff of Wasco County, Oregon, who no doubt looked over the "Round Table" page a few months ago when we mentioned some experiences with iron for changing tree reactions against blight. He continues:

"A neighbor had some seedling Royal Anne cherries which bore very little fruit, evidently due to lack of effective cross-pollination. However, to his surprise, after his children had driven nails into the trees they bore a good crop.

"My neighbor said he thought the trees needed iron or zinc, but I am inclined to believe that the reason the trees bore after having nails driven into them can be attributed to that trait of most fruit trees to put forth every effort to reproduce themselves when facing destruction, either man-made, such as ringing, or from natural causes. A dying fruit tree nearly always blossoms and tries to bear fruit. But my neighbor may have been right in his explanation of the phenomenon. Who knows?"

REVEALS METHOD FOR MOVING HIVING BEES

MRS. F. F. HATTER of Casey County, Kentucky, explains below her method of moving bees that have clustered on branches she wants to save.

"I tie a one and one-half gallon tin pail to a pole with wire and then lift the pole so the pail will be underneath the cluster. With a gentle push some of the bees will go inside the pail and can be lowered to a hive which has been placed at the base of the tree. Repeat the operation as needed and then shake the branch with a rake or hoe to remove the bees that won't go in the pail. Most of them will fall and crawl into the hive entrance."

VETERAN ORCHARDIST USES WHALE OIL FOR RABBITS

"SINCE 1890 I have planted more than 300 acres of apple orchards," writes fruit grower William Mohler of Okanogan County, Washington, "and protecting the trees from rabbits was a big problem until I learned that neither jack rabbits nor cottontails will touch the bark of a tree that has been covered with a thin coating of whale oil (not fish oil)."

"Late every fall I apply a thin coating of whale oil to the trees with a paint brush and the rabbits will not bark the trees. Whale oil will cause no damage to trees, and I've been told that it even helps them."



AMERICAN FRUIT GROWER

Among the Lowest-Priced Cars, Here's

"THE LONGEST OF THE LOT!"

181 inches—



The Master 85 Sport Sedan, \$740*

From front of grille to rear of body—for length where length counts—Chevrolet for 1940 is the longest of all lowest-priced cars!

In addition to being the streamlined *beauty leader* of "Automobile Row"—in addition to being the ablest *all-round performer* in its field—

This new Chevrolet for 1940 is also the *longest* of all lowest-priced cars—bar none!

It's a whopping 181 inches long from the front of its fashionable grille to the rear of its beautifully curved body . . . which means it has length where length counts . . . which means it's the longest automobile in the lowest price field!

And, of course, this extra length in Chevrolet for '40 means extra riding ease—extra safety—extra richness of appearance in a motor car you and your family will be mighty proud to own!

Your own thoughts will tell you "Chevrolet's FIRST Again," so eye it . . . try it . . . buy it—today!

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NEW "ROYAL CLIPPER" STYLING •
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AND UP, *at Flint, Michigan. Transportation
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extra. Prices subject to change without notice.
Bumper guards—extra on Master 85 Series.
A General Motors Value.

"Chevrolet's FIRST Again!"

WILLIE GETS AN

"A"



Willie's not so dumb! To make a good impression on teacher, he bought the finest, juiciest apple he could find.

Successful growers have their own method of getting Grade "A" crops. They follow a comprehensive spraying program including two tested insecticides—Dowspray* Dormant and "MIKE" Sulfur.*

Dowspray Dormant will protect the crop against more insects than any other dormant

spray. It mixes easily, is economical to use and harmless to both workers and equipment. "MIKE" Sulfur is non-caustic—more than 95% active sulfur—15 times finer than ordinary 325 mesh. "MIKE" goes into suspension immediately, stays free-flowing indefinitely and does not deteriorate with age.

THE DOW CHEMICAL COMPANY • Midland, Michigan
Branch Sales Offices: 30 Rockefeller Plaza, New York City; Second and Madison Streets, St. Louis; Field Building, Chicago.



AND HERE'S THE REASON WHY:

The apple Willie gave teacher was protected by Dowspray Dormant from rosy apple aphid, early green aphid, San Jose scale, scurfy scale, bud moth, and European red mite. "MIKE" controlled scab infestation without burning foliage and allowed green healthy leaves to develop—foliage necessary to produce grade "A" fruit.

*Trade Mark

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DORMANT**



**"MIKE"
SULFUR**

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